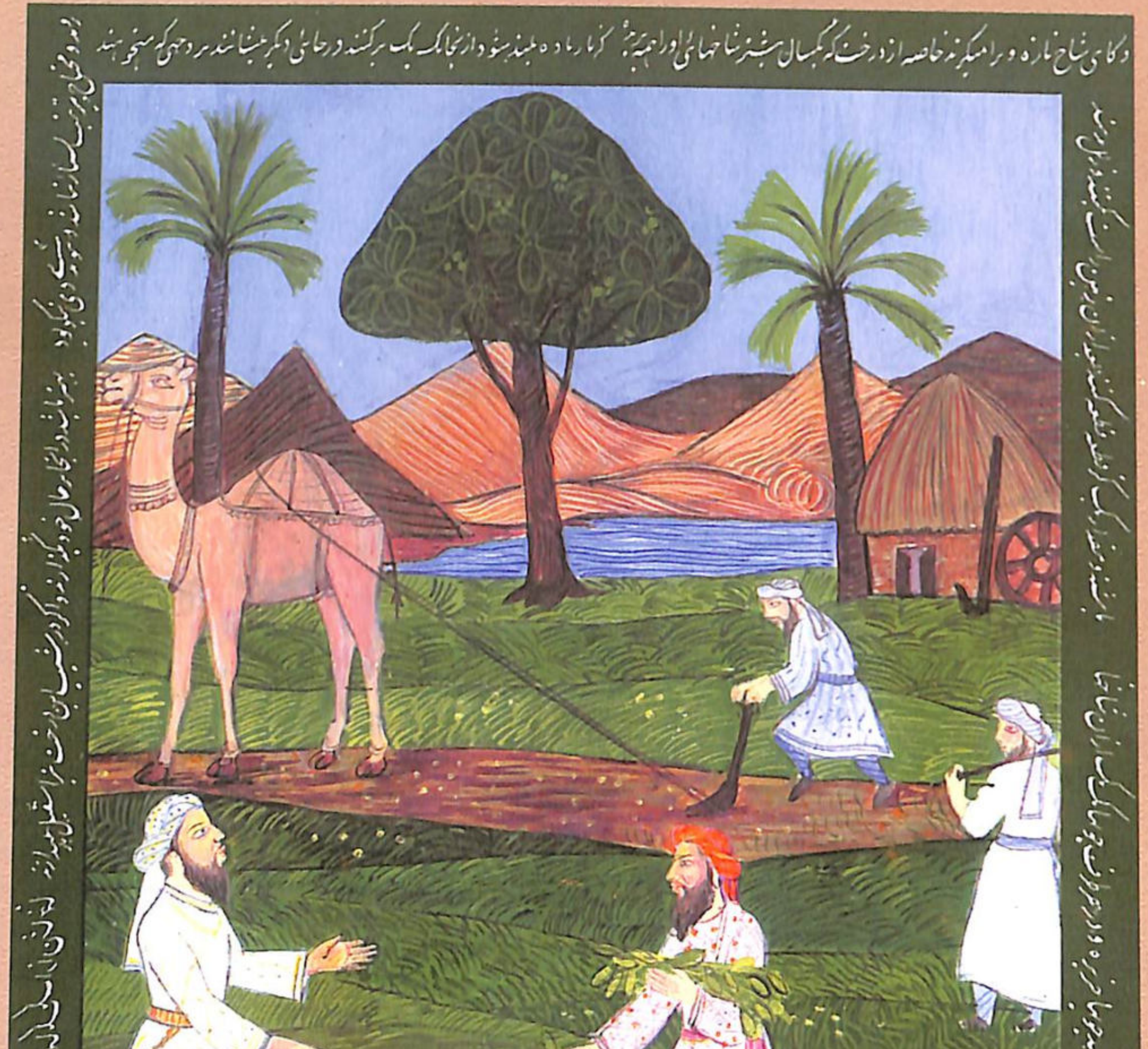
Nuskha Dar Fanni-Falahat

The Art of Agriculture



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Nuskha Dar Fanni-Falahat

(The Art of Agriculture)

(Persian manuscript compiled in the 17th century
by the Mughal Prince Dara Shikoh)

Translated
by
Razia Akbar

Commentaries
by
K L Mehra, K L Chadha,
J S Kanwar, and Y L Nene

Agri-History Bulletin No. 3

Asian Agri-History Foundation

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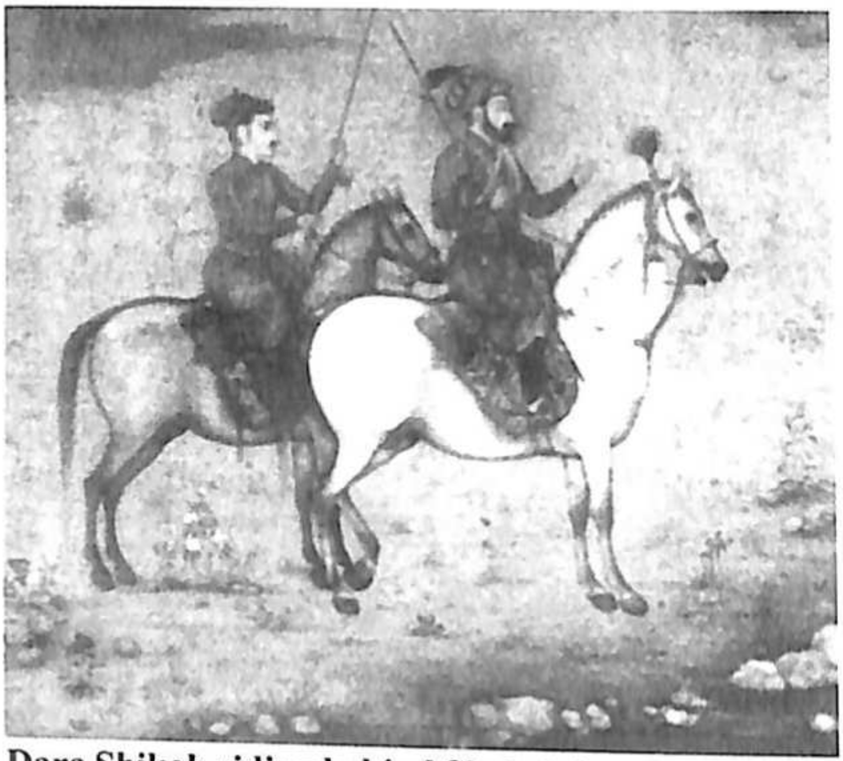
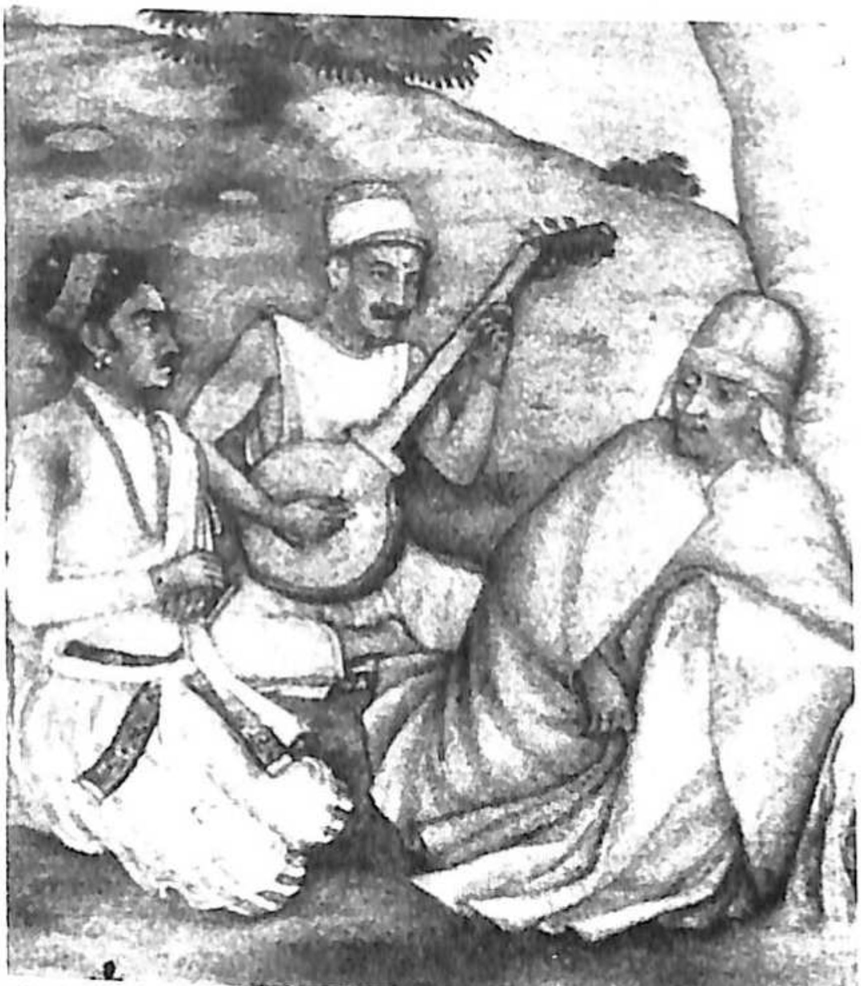
Nuskha Dar Fanni-Falahat 1
(In Persian) (from back cover)



Dara Shikoh riding behind Shah Jahan. Mughal Painting, c. 1638.



Dara Shikoh with a holy man. Mughal Painting, c. 1635.

Source: Beach, M.C. 1992. The New Cambridge History of India: Mughal and Rajput Painting. Cambridge University Press, Cambridge, UK.

Foreword

The Asian Agri-History Foundation (AAHF), a non-profit Trust, was established and registered in 1994 to facilitate dissemination of information on agricultural history to promote research on sustainable agriculture in South and Southeast Asia region. This region had generally provided food security to its population for several millennia, with only occasional famines in a few limited pockets due primarily to drought. Farmers in the region had evolved some of the most sustainable agriculture management technologies suitable for different agroecoregions. There is a great deal to be learnt from the traditional wisdom and the indigenous, time-tested technologies that have sustained the farmers of South and Southeast Asia in the past. The historical perspective of gradual development of traditional technologies will provide clues for (i) understanding how farmers adjusted to changing environment in the past, and (ii) developing appropriate technologies leading to prosperous, sustainable agriculture. One of the major objectives of AAHF is to disseminate information on agriculture of the past by translating old texts/manuscripts into English and publish these translations with commentaries on the scientific content of texts. The aim of such commentaries by experts is to stimulate research to confirm, or otherwise, many old practices.

AAHF has so far published two bulletins: Vrikshayurveda (The Science of Plant Life) by Surapala (circa 1000 AD) and Krishi-Parashara (Agriculture by Parashara; circa 1st century AD). This bulletin, Nuskha Dar Fanni-Falahat (The Art of Agriculture) is approximately a 300-year-old manuscript written in Persian and the author, most likely, is Dara Shikoh. The manuscript of Nuskha Dar Fanni-Falahat (no. 51, Lytton collection) is available at the Maulana Azad Library of the Aligarh Muslim University, Aligarh, India.

According to Rahman, this manuscript was "transcribed" in 1693 and though attributed to Dara Shikoh, appears to be a work of Amanullah Husaini, son of Mahabat Khan, a noble in the court of Jahangir (1569–1627 AD), who was the Mughal ruler of a large part of the Indian subcontinent from 1605 to 1627 AD [Source: Rahman, A. 1984. Science and technology in medieval India. In: Science and Technology in Indian Culture – A Historical Perspective (Rahman, A., ed.). National Institute of Science, Technology & Development Studies (NISTADS), New Delhi, India. pp. 123–141.]. Jahangir wrote his memoirs in detail and one does find references to the names of Mahabat Khan and Amanullah, but always as loyal officers who were busy in battles almost all the time [Source: Rogers, A. and Beveridge, H. 1909 and 1914. The Tuzuk-i-Jahangiri (Memoirs of Jahangir). Vol. I & II. Royal Asiatic Society, London, UK. 478 pp. and 315 pp.]. There is no indication about scholarship of Amanullah and Rahman has given no reference to support his view about the authorship of this text. According to Rahman, this manuscript is a summarized version of a full text. Since the colophon clearly mentions Dara Shikoh as the compiler, and since he was known to be a great scholar, we would like to maintain that Dara Shikoh was the 'author' and not Amanullah. Since it is unlikely that Dara Shikoh had expertise in crop production, he must have sought help from experienced agriculturists.

Who was Dara Shikoh? A description by Maheshwar Dayal is reproduced below [Source: Dayal, Maheshwar. 1975. Rediscovering Delhi – The Story of Shahajahanabad. S. Chand & Co. (Pvt.) Ltd., New Delhi, India. 237 pp.]. It gives an idea about Dara Shikoh's scholarship, location of his library in the city of Delhi, and his tragic end.

"As soon as you pass the Lothian Bridge towards Kashmere Gate, you will come across a 300-year old building near the General Post Office. The pillars and verandah in this building were added by the British when they occupied Delhi in 1803 after defeating the Mahrattas. One can see in this building a tablet reading: "Qadimi Makan Residency." Lord Metcalfe and David Ochterlony lived in this building, and Bishop Heber, the famous traveller, stayed here. At various times and for different periods, this building was occupied by the Delhi College, the District School, the Municipal Board School and the Government School. It is now a part of the Delhi Engineering College Complex. Until 50 years ago, another tablet could be seen at the gate of this building, which said: "Kutub Khana Dara Shikoh"—Dara Shikoh's Library."

"Emperor Shahjahan's son Dara Shikoh was a very learned scholar, who spent long hours in study and in discussion with Hindu and Muslim saints and scholars, and collected many books, wrote several, and got a large number translated into Persian. In May 1657, he got together a number of *Sanyasis* and Yogis from Benares at Nigambodh in the city of Delhi, and had the Yoga-Vasishta translated into Persian. He also translated the Bhagavad Gita into Persian, probably with the help of Hindu scholars. The most significant and the most controversial of his translations was Sirr-i-Akbar, a Persian rendering of 52 Upanisads. The most important book Dara Shikoh wrote is Majmuaul-Baharain. It pleads for the "mingling of the two oceans" and is a comparative study of Hinduism and Islam. In it Dara ably expounds his theory and conviction that the two faiths are not irreconcilable. This one book is a living monument to Dara Shikoh's liberal views."

"After his defeat by his brother Aurangzeb at Samugarh, Dara Shikoh wandered from place to place with a band of loyal followers, until he was ultimately betrayed by Malik Jiwan, a person whom he had once saved from being trampled under the feet of elephants. Dara Shikoh was brought to Delhi on an elephant with an open howdah, his feet tied together, and closely guarded by Jiwan Khan, and a corps of archers carrying arrows fitted ready into their bows. In shabby clothes the prince was paraded through the streets and bazars. A vast crowd in Chandni Chowk showed their sympathy by throwing dust and stones at the treacherous Jiwan Khan. In the prison a group of assassins set upon Dara Shikoh, and took his severed head to Aurangzeb."

"After Dara Shikoh's death in 1659, the whole estate comprising his palace, *haveli*, library and garden was given to the *Subedar* of Lahore, Ali Mardan Khan, and later on, it came into the possession of Wazir Safdarjung, until it was captured by the British. In 1842, as if to revive the memory of Dara Shikoh, and to restore the building to the purpose for which it had been constructed, the Delhi college was shifted here from Madrasa Ghazi-ud-din outside the Ajmeri Gate, the building now occupied by it. Ghazi-ud-din Khan was the trusted *Subedar* of Deccan, both of Alamgir (Aurangzeb) and Bahadur Shah I, and the father of the first Nizam. When he died in 1710, his body was brought to Delhi and laid to rest in a mausoleum near Ajmeri Gate, which he had himself constructed a few years earlier. Close by, a madrasa was established after him, in 1792, at which the study of Oriental Languages and Islamic religious education were imparted. When the British Parliament approved an expenditure of Rs. 1 lakh for the education of Indians for the first time in 1824, a grant of Rs. 500 per month was given to Delhi College out of this sum. Charles Metcalfe introduced the teaching of English in 1828 and in 1830 the departments of Oriental Languages and English were separated, though under the same Principal and Managing Committee. With gradual expansion, the College was shifted in 1842 to Dara Shikoh's library building. In the meantime, opposition began to grow to the teaching of English and Muslims began discouraging their children from going to this College. This national feeling reached its culmination on the 11th May 1857, when the sepoys and *sowars* from Meerut looted the College and destroyed all the books."

According to Eraly, "Dara was the most cultured of the sons of Shahjahan; he was in fact the finest scholar the Mughal dynasty had ever produced, and was the author of six books. He was also a poet and like Babur, a skilled calligraphist." [Source: Eraly, A. 1997. The Last Spring. The Lives and Times of the Great Mughals. VIKING Penguin Books India (P) Ltd., New Delhi, India. 944 pp.]

"Dara's Persian translation of the Upanisads, rendered in turn into Latin and published in Europe a century and a half later, in 1801, was read by Schopenhauer, the German philosopher, who spoke of the book as the solace of my life, the solace of my death."

The translation of the Persian text, Nuskha Dar Fanni-Falahat, was completed with paintstaking efforts by Dr Razia Akbar, Professor of Persian (Retired), Osmania University, Hyderabad, India. AAHF is especially grateful to her for completing a rather challenging and difficult task.

Three well-known agricultural scientists, Drs J S Kanwar, K L Chadha, and K L Mehra, agreed to critically read the contents of the text and offer their comments. In addition, I also wrote a commentary. All the commentators were fully conscious of the fact that the manuscript is a 300-year-old, abridged version and describes practices that would appear too simple, routine, and/or even weird. However, each one has tried to unveil the scientific validity wherever noticed. The commentators have repeatedly pointed out the need to confirm or otherwise, several of the practices that are not easily understood today.

One of the difficulties faced with old texts is that the recommendations stated are too brief and it is not easy to comprehend the steps that had been followed. Also, reasons for recommending a specific prescription are not given, forcing us to use our imagination. Frequently, therefore, we are tempted to discard recommendations as something nonsense. Such a temptation, however, is unfortunate because surely our ancestors were no fools. It would be prudent to give deep thought to all recommendations and do our best to devise experiments to confirm or otherwise the recommendations made in such old texts. We should look at the contents of old manuscripts as fresh opportunities to carry out research and utilize the generated information, if practical, in the present-day agriculture.

The author of the manuscript has apparently attempted to compile a compendium of economic plants grown at that time with a view to document and share information with others. If this text is a "summarized version" as Rahman has pointed out, there probably exists a "full text" or may be it is lost forever.

The translator Dr Razia Akbar and Dr K L Mehra did their best in identifying the English and Latin names of most plant species from the Persian names given in the text. The staff of the AAHF (Y L Nene and Sheila Vijayakumar) also made efforts to identify Latin names; these are given in Appendix 1.

The original manuscript does not have paragraph numbers. We have numbered the paragraphs in the English translation to facilitate work of commentators. Latin names of plant species are listed in the commentary by Dr K L Mehra and in Appendix 1. Therefore, the names of all plant species are not given in other commentaries and in the English translation.

AAHF is grateful to the translator, Dr Razia Akbar and commentators Drs J S Kanwar, K L Chadha, and K L Mehra for their hard work without which this Persian text would have remained a museum piece.

Y L Nene
Chairman
Asian Agri-History Foundation
Secunderabad, India

Nuskha Dar Fanni-Falahat

Translated by Razia Akbar

The Art of Agriculture[1]

Introduction

1. Dry or wet, both kinds of lands can be cultivated. The dry land that does not yield a good crop, can be made more productive if the Egyptian variety of beans are grown on it for a year.

Best season for cultivation

2. Experienced farmers say that the best time for cultivation is when the Sun is in the sign of Libra, but it must be remembered that seeds should not be sown when the North wind is blowing, for in that case, seeds will not yield good crop.

3. Some farmers sow seeds in the beginning of the season, some in the middle, and some in the end, so that if one crop is damaged, the next one survives.

4. Usually the best time for sowing the seeds is first half of the sowing season. That will yield a good crop and the production will be high.

Fields without weeds

5. If you want your fields to remain free from weeds, pull out the weeds with a weeding knife from their very roots, when the Sun is in the sign of Gemini. Then leave them there in a heap to dry up and decompose. After this, mix them in the manure. Weeds will not grow there again.

6. If the weeding knife is made of copper, it will prevent the weeds from growing again.

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[1] The Persian text "Nuskha Dar Fanni-Falahat" does not have paragraph numbers. However, in the English translation "The Art of Agriculture", paragraphs have been numbered to facilitate the work on commentaries. These paragraph numbers have been used in the commentaries in **'bold'** font.

7. It is also said that if the roots of a tree, which has thorns, are scraped and cut at dawn, during the rising of the sign of Zodiac, and a mixture of tar and pitch is applied on the place from where the tree has been cut, the tree will not blossom again. It is also said that if the weeds are cut when the moon is in the sign of Virgo, i.e., the last days of lunar month, they never grow again.

Best time for planting trees

8. The best time for planting trees is when the Sun is in the sign of Libra. They can also be planted from the end of the sign of Pisces till the beginning of the sign of Aries.

9. It is said that the trees that are planted in autumn do not grow long branches and roots. On the contrary, the trees that are planted during the spring season grow a large number of branches.

10. If trees are planted during the waning of the moon, they will not grow very tall, and will produce more fruits. On the contrary, if trees are planted in bright moonlight, they will grow very tall and produce less fruits.

Transplanting big trees

11. If you want to transplant a big tree, keep the following points in mind.

12. Dig a pit three yards long, three yards wide, and three yards deep. Cut off some branches of the tree to reduce its weight.

13. Then dig up the tree along with all its roots and "veins", without causing any harm to them; and then, instead of roughly handling the tree, carry it carefully to the place where it is to be planted and lower it to the bottom of the pit which has been made for it, in such a way that if its branches were facing east, even now they should face east, and its position remains the same as it was before its transfer; and straighten its "veins" so that they do not remain entangled with each other. Then, support with three wooden stakes so that it does not shake in the wind.

14. After this, in order to water it, get two water-filled pitchers with small holes at their bottom; place them on either side of its roots in such a way that water keeps dripping on it. And keep refilling the pitchers when their water level falls.

15. Continue the process for two months, then water the tree normally.

To dry up a tree

16. If you want a tree to dry up, fill your mouth with lentils, chew them at breakfast time, and catch the branches of the tree with your teeth; the tree will dry up.

17. Or, if the roots of the tree are branded several times with a red-hot iron, the tree will dry up.

18. Or, if the roots of the tree are opened up in such a way that all their "veins" get exposed, and the ashes of an old horn of a sheep are kept in between them, even then the tree will dry up.

Seedless pomegranates

19. At the time of planting the pomegranate tree, make a vertical one-yard long slit on the lower part of its trunk and take out its pith. Then remix it and tie it on a wooden splinter, and cover it with a layer of clean clayey soil in such a way that the slit remains three inches above the ground. When it sprouts and grows again, cut it above the slit. The tree will yield seedless pomegranates.

20. If at the time of planting a pomegranate tree, three pebbles are spread around its trunk, or a sea-onion or squill (*Urginea maritima*) is kept under its roots, and it is planted in such a way that it remains slanted to one side and its branches remain within the pit, its fruits will not crack.

Thin husk of walnut

21. If a walnut is cracked, its kernel is taken out and wrapped in a woolen cloth or in the leaves of poplar (*Populus* sp.) tree, and

sown, it will be safe from insects and the husk of its fruits will be very thin. Some people, however, sow walnut as it is; its husk even then will be thin.

Grafting

22. Any tree which has a thick bark can be grafted in the following manner: A hole is made in the bark of a tree with a bamboo spike or any other spiked wood; then a branch of the tree which is to be grafted is passed through it and tied to a wooden splinter, which is then covered with clayey soil. After this, a pitcher that has a tiny hole at the bottom is filled with water and kept hanging over the graft so that water may keep dripping, drop by drop, on it. This process is continued till the tree is fully grafted.

23. It will not be proper to do grafting when the North wind blows. It will be better if grafting is done in the waning light of the moon, when the South wind blows. If there is rainfall on the graft, it will be beneficial, provided the skin of the grafted tree is thin; because if it is thick, rainfall will be harmful.

Grafting time

24. The best time for grafting is from the beginning of autumn to the month of *Azur* (December), when there is equinox.

25. Some people say that it is better if grafting is done when Sirius is in ascendance and summer heat is less.

Trees that can be grafted together

26. A branch of fig tree can be grafted on apple, guava, and mulberry tree because all these trees are compatible companions of each other. At the time of their grafting when a hole is being made in the bark of the tree, care should be taken that it does not cause any damage to it. However, a hole can be made with a drill through the guava tree.

27. If a branch of guava tree is grafted on mulberry tree, the fruits of the guava tree will be red. Similarly, if a branch of apple tree is grafted on mulberry tree, the fruits of the apple tree will be red.

28. Walnut tree cannot be grafted on any other tree. It can be grafted only on itself.

29. Apricot and almond trees can be grafted on each other. As all trees are compatible companions of quince tree, all can be grafted on it.

30. A branch of orange tree can be grafted on apple tree. If it is grafted on mulberry tree, it will produce red oranges.

31. It is said that pomegranate tree is a compatible companion of orange tree and orange tree is a compatible companion of vine.

32. Almond and pistachio trees can be grafted on green berry trees.

33. Sometimes a vine is grafted on apple tree in this manner: When the two are near each other, a hole is drilled through the trunk of the apple tree and the nearest branch of the vine is inserted through it, but it is not separated immediately from the vine. After two years when the vine covers the hole completely, it is cut from the vine. By this time the grafted creeper of the vine has united itself to the apple tree and gets sustenance from it. This vine will produce more grapes than other vines. During the two years, new branches of the apple tree are cut to give more strength to the vine.

34. Some people graft peach tree on apple tree in this way: First, a sapling of the willow tree is planted. Then a seed of peach tree is grown near it. When both grow up, a branch of the willow tree is made spiky and buried firmly in the ground. After this, a hole is made in the middle of the cuneiformed branch of the willow tree and a branch of the peach tree is passed through it to the other end.

35. The split in the willow tree is then covered by a splinter, which is tied on it tightly with a string and covered with clayey soil. Then, a water-filled pitcher with small holes at its bottom, is hung over the graft so that its water may keep dripping, drop by drop, on it throughout summer. Then, in the next spring, the roots of the peach tree are severed from the willow tree.

36. Fruits produced by this peach tree will be seedless.

37. If you want to make peaches sweet, take one seed each of quince and almond, remove their pith, place it in the pith of a peach and sow them. When the three seeds grow up in the form of one peach tree, the fruits of this peach tree will be very sweet.

38. If a rose is grown near a peach tree, the fruits of this peach tree will be sweet-smelling.

Preservation

Fruits

39. Quince (*behi*) is a kind of apple. In order to preserve its fruits, pluck them from its vine, dig a man-waist deep pit near it, put all the fruits in it, cover them with its leaves and sand, level the surface, and water it every fortnight. The fruits will remain preserved for a year.

40. Apples can also be preserved in the same way. If melted marine pitch is applied to the roots of apricot tree, its fruits will last for a long time and will not rot.

41. In order to make apricots sweet, put a maund (37 kg) of salt around the roots of its tree four times a year. Its fruit will be very sweet.

Flowers

42. Lily is a blue flower. It grows in deserts also. If one of its matured buds is put in a pot, and the mouth of the pot is covered and sealed with clayey soil, and the pot is buried in the ground

for a year, the bud will remain as fresh as it was before. And then if the bud is kept in the sun, it will blossom into a flower that will last for many days.

43. If the bud of a red rose is kept in a reed (hollow) and is buried in the ground for some time, and then is taken out of the reed and hot water is poured on it, it will immediately blossom into a flower which will last for many days.

Planting

Palm tree

44. The palm tree is a very noble tree of tropical countries. It resembles the living beings very much. For example, if its 'head' (top) is cut, it dies and never grows again. Palm is male as well as female and unless the male unites with the female, it remains fruitless. The male tree loves the female. Hence it is said that if the female tree is in another garden, the male tree bends towards it. The male smells like man's semen.

45. The best season for planting the palm tree is summer. If you want to cultivate it from its seed, dig a two-yards pit in the saline soil, mix a little dung and salt with the soil and put them in the pit. After this, get a seed of good variety from a fruit-growing palm tree, soak it in water for two days, make a slit in it and sow it in the pit in such a way that the belly of the seed remains upwards and its thin end faces the east. When the seed sprouts, water it once a day for two years. After this, either let it grow at the same place or shift it to another place.

46. If you want to grow the tree from its saplings which shoot up around the roots of the tree, choose one which is three or four years old, uproot it carefully along with its roots; plant it at a new place; soften up the soil around its roots once a year; and put in it a little salt and nitre so that the plant becomes vigorous. The sediment of wine can also be poured in it.

47. If the tree does not bear fruits, cut and exchange the husks of two such trees and fix them on the opposite trunks. Both trees will bear fruits.

48. If male and female palm trees are crossed with each other, both will grow fruits.

Vine (grapevine)

49. Vines are also very noble. Their creepers intertwine with each other and become 3–4 thousand yards long. Longer the branches, more vigorous they become, and if they are pruned at the right time, they grow more branches and produce more fruits.

50. Grapes grow in hot as well as in cold countries. And according to some people, the season to grow them is from the tenth month of the year, when cold winds blow. Some people grow them during the season when trees are planted, and according to some, this is the season for pruning. In other words, vines are cultivated in autumn at such places which have less water, before the last two or three nights of the lunar month. And their pruning time is fixed accordingly.

51. The best land for growing vines is that which has very clean and pure soil, where vines have been grown. If this land is dug one yard deep, and a little soil collected from the bottom is mixed in rain water and strained into a glass container, it will taste like grapes and wine.

52. Vines are grown sometimes from seeds and sometimes from cuttings. For this the soil is thoroughly stirred up and loosened, then manure is put in it, then holes are dug 3–4 yards apart and the cuttings are vertically planted in them in such a way that their tops remain six inches above the ground and face the same direction.

53. When the cuttings begin to sprout, their branches are spread on stakes, trees, and bamboo sticks. Some people allow them to

spread and grow in a specially-prepared pound. The last method is good for cold places.

54. At certain places, which do not have enough water, pits with broad bottoms and narrow necks are dug one and a half yards apart and a few cuttings are planted in them, after which 3–4 stones or clods are placed around them.

55. Then every year the soil around them is loosened, the roots are cleaned and a little sand is put there to absorb the water.

56. And at such a place where water does not reach but the soil is good, ditches are dug ten yards apart and so deep that underground water comes out from the bottom or moist soil appears. Then 20–30 cuttings of good variety are planted in them. If they sprout and come out from the pits, well and good; otherwise they are left in them and covered, till their branches come out of the soil. Then they are spread on the ground or over the stakes.

57. Cuttings, however, should not be taken from a new garden or from a ditch-garden, but from a seven- or eight-year-old garden, and from fruit-bearing vines which have matured in suitable climate. And these cuttings should be taken from the middle of the stems. And they should not be thick, old, and weak; but new, healthy, and strong, and all of the same size and length. If the lower parts of these cuttings are in the shape of a polo-stick, i.e., they are T-shaped at their ends, they will grow faster.

58. If it is not possible to plant the new cuttings immediately, they should be buried under damp soil or stored in a container that has moisture, and then planted.

59. In case saplings having roots are planted, they should be gradually grafted on selected stems year after year; and their superfluous branches should be pruned every year so that the remaining branches may become stronger. The unwanted branches

of the vines which are to be transplanted from place to place should be broken by hand and not cut with a knife or blade.

60. The most appropriate method of grafting them is this: new branches of a 3- to 4-year-old vine are cut from its bottom and are grafted on a suitable stem in such a manner that both merge into each other and become one.

61. If you want to produce sweet grapes, their cuttings should be planted in a high, sandy, and gritty ground that has soft rocks.

62. If you want that a bunch of grapes should have grapes of different colors, put the cuttings (branches) of those vines, which produce grapes of different colors, into a cow's shinbone or tie them tightly with a cord, and plant them in a specially made pit. After a few years, they will produce bunches which will have grapes of different colors.

63. If you want to produce seedless grapes or grapes with less seeds, slit a branch of the vine, take out its pith, cover the slit of the branch with it, and tie them with a raw string so that the two may merge with each other, and then plant them. The vine which will grow from this grafting will produce seedless grapes or grapes with less seeds.

64. If, instead of pith, opium is tied on the slit, and a little bit of opium is added to the soil, and is also mixed in the water which is given to the vine once a week, the vine will have the characteristics of opium. And, if pounded leaves of this vine are applied on a wound caused by a snakebite, the snake's poison will not have any effect.

65. And if the pounded wood of this vine is mixed with cow's urine or the milk of a she-ass, the mixture will act as an antidote against snake's poison.

66. If at the time of planting a vine cutting, dung is applied on its lower part, it will produce roots quickly and will remain safe from insects.

67. If lentils, gram (chickpea), vetch (?) (*mash;* black gram ?), and beans (*raaj-maan; Vicia faba*) are mixed in dry grass and the mixture is put in the pits of the vines, the vines will remain safe from insects. They will also remain safe from insects if cucumber, beans, and pumpkin are grown around them. And if pine oil is sprinkled on the lower part of the cuttings of vine, even then also they will remain free from insects.

68. If a thick concoction of burnt nitre and water is sprinkled on the branches of vines when they are being pruned, the vines will yield more fruits at an early date. And if nitre is mixed in vine sap and the mixture is administered to the roots of the vines, the vines will yield early and more fruits of better quality.

69. If a branch of a vine, which is climbing on a plum tree, is cut, and the branches of the plum tree are covered with clayey soil, both vine and plum tree will yield their fruits at the same time.

70. And if melted fat is rubbed on the knife with which the branches of the vine are to be cut; or a mixture of garlic paste and oil is applied to its roots; or a mixture of the dust of the dried leaves of vine, the sap of its pruned branches, and wine is kept in an earthen pot and is applied to the vineyard during winter, the vineyard will remain free from insects and pests.

Fig

71. Fig tree is a noble tree.

72. Figs are mostly grown in hot places and temperate climate. Best soil for them is that which is strong and humid but away from water. They are grown from seeds, cuttings, and saplings.

73. If they are to be grown from seeds, select seeds of good quality, soak them in water, mix them with cowdung, besmear them with raw yarn, drop a handful of them in a hole, cover the hole with soil and water them immediately. After some time when all the seeds sprout and the plants become a yard high, replant

them at another place; and when they become three yards high, uproot them and replant them at a third place and the same night apply some insecticide such as resin on their roots so that they are not inflicted by insects.

74. If figs are to be produced from cuttings, select few healthy ones, soak them in salt water for three days, and plant them in a specially prepared place. It will be better if smeared with cowdung before they are planted.

75. If fig seeds of different colors are bound together in an old fine linen and sown four fingers deep, and after all of them sprout and become plants of different colors and are separated from each other and planted at a new place, all of them produce figs of the same color.

76. And if these plants of different colors are not separated and all of them are bound tightly together with a string and planted, they will produce figs of different colors.

77. If fig trees are to be produced from cuttings, the cuttings should not be more than half a yard long and planted in such a way that half of their length remains in the soil and the other half above it. If they are kept tilted to a side when they are being planted, they will produce more fruits that will be lighter and tastier.

78. If two or three eggs are bunged beneath each plant, it will produce more figs. Or, if the sap of the pounded leaves of olive is sprinkled on a fig tree it will grow more figs.

79. If the fruits of a fig tree fall off, open its “veins” and roots and put a little salt and mulberry vinegar on them; its fruits will not fall off.

80. If the cuttings of a wild fig tree are soaked in a mixture of sesame oil and wine, and they are then planted and watered, their fruits will be more delicious than those which are planted in gardens.

81. If droppings of birds are mixed with the dust of black pepper and applied on raw figs, they will ripen faster.

82. And if any words or figures are etched on the roots of a fig tree with a thin needle or any such instrument, the same words and figures reappear in its fruits.

Olive

83. Olive tree is also a noble tree. It grows in mountains as well as in jungles. Most appropriate soil for it is that which is not humid. Best soil for it is low-lying red soil.

84. Olive trees are grown from seeds and also from branches.

85. To grow them select the most appropriate soil, clean it of all mud and brambles. Dig three-feet pits there. Keep them open for a year so that they may be exposed to air and heat. If early planting is required, light fire in these pits for two months, after which keep the branches of the olive tree in clayey soil for seven days, and on the eighth day, plant these in such a way that half part of these remains above the ground. And water them twice a day till their roots become strong.

86. At a place that is unsuitable for them, shallow basins are dug around the planted branches to retain water and receive it from every side.

87. Soil around them must be stirred and overturned. Only those cuttings should be planted which have been taken from fruit-bearing trees, are straight and without knots, are as thick as the branches of the vine, are not older than two years, and have been cut from a trunk which is near the roots in such a way that a part of the original tree remains with the bark.

88. To make an olive tree more fruitful, make a hole in the lower part of the trunk, pass through it two branches of a fruit-bearing tree without leaving any fissure or gap between them, cut them carefully and cover the hole from both sides with clayey soil.

89. If at the time of planting them, some grass is kept at the bottom of the olive branches, they will grow fast.

90. It is necessary that the soil around them is loosened every year and some dung and manure is put in it.

91. If the olive plants grow more leaves and less fruits, the sap of the jungle (wild) olive tree should be put on their roots once in four days. The plants will grow more fruits and less branches.

92. If the olive fruits fall off, a certain type of grass known as *"aqtaha"* should be kept on them like a crown. Then the fruits will not fall off.

93. It is grafted in two ways. One, a hole is made on its trunk, an olive branch is passed through it and grafted, and a water-container with holes at its bottom is kept above it so that water may keep dripping over the graft. In the other method, a hole is made near the lower part of the trunk of the tree and an olive branch is grafted on it.

94. If an olive tree is grafted on a vine or apple tree its fruits will have the flavor of grapes or apples.

Pomegranate

95. Pomegranate is also a noble tree and grows in hot countries in moderate climate. Dry and gritty soil is most appropriate for it. It is cultivated from seeds, branches, and roots.

96. Before planting it, dig the proper soil thoroughly and put a lot of manure in it. Then dig pits 3–4 yards apart; and plant 3–4 branches of the tree facing the sun and water them.

97. The branches chosen for cultivation should be from the upper part of the tree and not from the surrounding parts. And they should be broken by hand and not cut with a knife or blade.

98. If these branches have been brought from a distance, they should be kept in wet soil for a few days and then planted. They will grow quickly and sprout better.

99. The unwanted and superficial branches of the planted tree are removed every year. Its roots are opened up and given a lot of manure and water till their fruits become strong. Then they are not watered.

100. Pomegranates can be grafted on ermine (?) (*Ulmus wallichiana* ?), mulberry, citron, apple, quince, and other trees also.

101. If a branch of a pomegranate tree is slit, pith is taken out, and the slit is sealed with a string and smeared with earth and cowdung and planted, it will grow pomegranates which will be red and of good quality.

102. And if pig's dung is administered to its roots, which have been opened up, and are then covered with earth and made wet with man's urine, it will grow very sweet pomegranates.

103. And if its branches are kept slanted to one side when they are being planted and resin is put on their roots, its fruits will not crack, and will remain safe from insects.

104. If its roots are covered with the roots and leaves of pumpkin during winter, birds will not come near and eat the fruits.

105. Pomegranate tree can be grafted on several other trees, provided its decayed branches are pruned and only healthy branches are grafted.

Apple

106. Apples grow in cold countries. They are grown in spring or autumn. It is better if they are grown in autumn, especially at a place where there is a shortage of water. Best soil for them is that which is cool, and gets a lot of breeze during summer.

107. Apples can be grown from seeds, branches, and saplings. To save them from insects, resin must be sprinkled on the soil where they are to be planted.

108. If sheep's droppings and pig's dung is mixed with man's urine, and the mixture is put around its roots, the cultivated tree will remain safe from insects.

109. To save apple plants from all calamities, mix donkey's dung in one liter of water and put it on its roots once a week.

110. If sediments of old wine are put on its roots, it will grow red apples.

111. For grafting it (apple) the most appropriate trees are citron and plum, because like it they also yield two crops of fruits during a year.

Guava

112. The best season to grow guavas is winter. They are grown from seeds and when their plants become about one and half yards tall, they should be transferred to a new place.

113. Saplings from the roots of guava trees should also be transplanted to another place. Guava trees can also be grafted. A branch is buried in the ground. When it produces roots, it is planted at another place.

114. Best manure for these (guavas) is man's excrement and dung of filthy animals; also sheep's blood.

115. Best trees on which guava tree can be grafted are apple trees or marine (aquatic ?) trees of jungle or garden.

Quince

116. Quinces can be grown from seeds as well as from their saplings. If saplings are from a grafted tree they grow better and quickly.

117. If they are not broad (healthy ?) their branches spread on the ground. When they produce roots they are transplanted to another place.

118. If a fresh branch of quince tree is cut and planted in the soil like willow's branch, even that will also grow. Quince plant requires plenty of water. Whenever it is watered, one and a half yards of its trunk should remain submerged in water, so that it may grow better and bigger fruits.

119. If quince tree is grafted on willow or jujube tree, it does not require much water.

Peach

120. Best season for growing peaches is spring. Peaches grow in wet soil. They should be grown at such places where it is easy to water them continuously, i.e., on the banks of canals or near them.

121. Its seed should be taken from a grafted tree and sown at a suitable place. When the plant becomes one year old, it should be shifted to another place.

122. It is better to graft it on other trees.

123. If its seed is sown in a meadow and after a few years it is sown in another meadow, its tree will not be fit for grafting, but its fruits will be very good.

124. To produce seedless peaches, plant a willow tree by the side of a peach tree, make a hole in the trunk of the willow tree, insert a branch of peach tree in it, bandage both with cabbage fibers, and cover them with clayey soil.

125. When the two trees grow and become one, the grafted branch of the peach tree is cut from its roots. But its upper branch is left attached to the willow tree. This tree will produce seedless peaches.

126. Peaches can be grafted on almond, apple, quince, jujube, and other similar trees. Peaches require plenty of manure and water.

Damson

127. Damsons (*Prunus insititia*) are also called plums. They grow in both hot and cold countries, in very strong and fertile soil. Damsons can also be grafted.

128. If their saplings are uprooted with their roots, and finger-span (about 9 inches) pieces of these roots are planted like seeds, they also grow and can be transplanted.

129. Damsons can be grafted on plums and similar trees.

Apricot

130. Apricots are grown and cultivated like plums.

Mulberry

131. Mulberries are grown in autumn and spring, from seeds, grafts, and saplings.

132. For growing them from seeds, prepare their soil well as is prepared for poppy seeds and onions. Then wash the mulberry seeds, dry them in shade, mix one maund (37 kg) of sand in the soil and sow them.

133. When their plants become a yard tall, or a little taller, select one with its roots and plant it at another place.

134. If mulberries are to be grafted, new branches of such a tree should be taken whose branches have been cut a year ago. Then cut these branches to pieces, each one yard long, put manure in the prepared soil, make trenches as are made for melons, and plant the cuttings one by one on both sides of the trenches with your hands, and water them.

135. After two years, transfer the grown plants to a properly developed place, leaving the "undergrown" behind.

136. If wild onions are added to the roots of the transferred plants, they will be very useful.

137. If white mulberries are grafted on black mulberries, they will grow white mulberries and if the reverse is done, black mulberries will grow.

138. Mulberries grafted on oak tree will give best results.

Khartoot

139. *Khartoot* (*Morus serrata* ?) is a wild and tasteless fruit. It does not require much care, and lasts for many days and keeps on growing irregularly.

140. If grafted its fruits will not be so tasteless. But it should be grafted on such trees which have a long life like poplars.

Plum

141. The plum tree is also like damson or *aloo-bukhara* and it is also cultivated like those trees. It grows very sweet fruits in cold countries. It is grafted on such trees that are very powerful.

142. It is usually grafted on itself with its own branch, which should be about four yards long.

Oak

143. The tree grows in cold countries on mountains and in forests. However, it will be better if it is grown on the boundaries of fields and gardens. It does not need much water. Its seeds are sown at one place. When they sprout and shoot up they are transplanted to other places.

King oak

144. Like oak, king oak (*shah-baloot*) tree also is grown in cold countries. The best season to grow it is spring. But it can be grown in autumn also.

145. Its seeds are kept buried in a pit throughout winter. By next spring these develop roots like beans and cucumbers or like the seeds of those trees, which are similar to it. If their plants are transferred to a new place they grow rapidly.

146. This oak tree can be grafted on almond, guava, or apple trees.

Almond

147. The best season for growing almonds is autumn and the beginning of spring.

148. Almond trees grow in hot countries, on islands and riverbeds. They do not require manure.

149. Almond seeds are soaked in water for three days and then sown in such a way that the pointed end of each seed remains northward.

150. Almonds are grown at one place and not shifted to other places.

151. For grafting, sometimes their upper branches are cut three yards long. This is a better method and produces better trees.

152. The branches of these trees are also grafted on other trees, but these should not be from grafted trees.

153. If dry dung of pigs is pounded and is put on the roots of an almond tree, the tree will grow sweet almonds.

154. If the branch of a bitter almond tree is grafted on the branch of a sweet almond tree, it will grow sweet almonds.

155. If an almond (tree) is split and any word is written or a sketch made on its pith, and the split is closed, and tied with a raw string and sown, the same word or sketch will appear in the almonds produced by it.

Walnut

156. Walnuts are sown in winter. They grow in winter. For it the soil should be very fertile.

157. If walnuts are soaked in old wine and urine of children and are sown, the husk of the fruits produced by these will be soft and tender.

158. If a walnut is carefully broken and its whole kernel is taken out intact, and that kernel is wrapped in wool, a woolen cloth, or the leaves of vine and is sown, the walnut produced by that tree will also have very thin husk. Almonds and other nuts like them can be grown in this way.

159. If the walnut tree is grafted on other trees, it will grow fruits early.

160. If a hole is made on the trunk of a walnut tree which is still laden with fruits, with something thin like an iron needle and the iron needle is left in the trunk, the fruits produced by that tree will remain whole and their husk will also be very thin.

161. Every walnut tree can be grafted on such trees which grow fruits like it, such as almonds, pistachios, etc.

162. Grafting of walnut tree is done in this manner: A two-year-old sapling is uprooted, its pith is taken out and thrown away, and it is grafted on the chosen tree. The grafted walnut tree will grow more fruits.

163. If you want a walnut tree to grow faster and produce bunches of walnuts, dig a pit, put in it a little mixture of manure and sand, place 10–12 walnuts at the bottom in a trench-like formation, cover the pit with earth, place on it an earthen pot with a narrow top, so that when it breaks, all the plants in the pit should come out from the pit through the narrow top. Then after three years, if all the shoots are tied together and covered with clayey soil, they will produce bunches of walnuts.

Pistachio

164. Pistachios grow in cold as well as hot countries. The tree does not require much manure and water. The best season to grow it is spring. If it is to be cultivated from its cuttings, the cuttings should be 2–3 years old.

165. If a big pistachio-nut is slit, its kernel taken out and wrapped

in a little wool or a woolen cloth (*pashmina*) and sown in such a way that its head is kept upwards, its tree will produce pistachios with bigger kernels and which have very thin skin.

166. Pistachios can be grafted on almonds and walnut trees also.

Hazelnut

167. The hazelnut is a well-known fruit of Persia and is red like jujube. Poets use it as a simile for beloved's lips. It grows high (at high altitudes) in cold and hot countries and also in jungles and gardens. It is grown during spring. Its seeds are usually sown in meadows, and their plants are transferred from those places to another place, after 3–4 years.

168. It is also cultivated from its cuttings and is even grafted on trees like oak or king oak.

Jujube

169. Jujube is a kind of berry. Its trees grow in cold as well as in hot countries. It can be grown from seeds, grafts, and saplings. Its saplings are grafted and transplanted. Its branch can also be grafted on another tree. This method is considered best.

170. It is said that if jujube is grafted on *aroor* (a kind of berry), it will produce a better tree. Its branches can be grafted on apple, guava, and quince.

Glutinous berry

171. Glutinous berries are used medicinally.

172. Glutinous berry is found in hot countries. Some of the trees are very big. Its leaves are green and bitter like those of citron. It can be grown from seeds, cuttings, and saplings. If grafted on another tree, it grows faster and becomes very big.

Ambergris (?)

173. Ambergris (?) is grown in autumn or at the beginning of spring.

174. If it is to be grown from branches, new branches should be cut and planted a yard apart; or they should be grafted. Grafting will be better.

175. If it is grown closely along the boundary of a garden, it will act as a hedge. It can be sown from seeds also. It does not need water and lasts for many years.

Shajar-ul-zaroor

176. *Shajar-ul-zaroor* (a kind of berry) tree grows better in mountains, but if its branches are planted in the garden, it yields more fruits, and will be more tasteful. They are red, with more pulp and less kernel.

177. If it is grafted on other trees such as guava, etc., it will grow better fruits.

Kandas

178. *Kandas* (*Sagertia* sp. ?) grows in forests as well as in gardens. The *kandas* fruits from the garden are very soft, big, and tasteful.

179. If its branch is grafted on *behi* (quince), the fruits will be very juicy and delicious.

180. If its sapling, shooting up from its root, or its branch is grafted on a tree, and then the branch of that grafted tree is grafted on another tree, its fruits will be very good.

181. Its seeds can be grown in meadows also.

Green berry

182. The green berry tree grows on mountains. It can be grown in gardens also and will yield better fruits. It is cultivated like pistachios and almonds. It can be grafted on their trees also.

Ermine (?)

183. Leaves of *moorid* (ermine ?; *Ulmus wallichiana* ?) are very

green and lush. Poets use it as a simile for the tresses of a beloved. It grows on mountains. Like green berry it can be grafted on other trees.

Barberry

184. Barberry trees are found in hot countries. It is also grown in gardens. Its fruits are like resins, but smaller and are sweet and sour. They are used in medicines.

185. If one-year-old saplings are transferred and planted at a specially-prepared place and their extra branches are regularly cut, and one of its branches is grafted on pomegranate or mulberry trees, it will yield very good fruits.

186. It can also be grafted on other trees. If the seeds of its grafted tree are sown and their plants are transferred to a new place, their fruits will also be very good.

187. If it is grown on the boundaries of gardens and banks of canals, its plants will serve as wall-like hedges.

Myrtle

188. The myrtle tree is found in hot countries. It grows in jungles and is also grown in gardens. Its tree is not very big and its leaves are small.

Sumach

189. The sumach (*sumaq*; *Rhus coriaria*) tree produces sour fruits, which are used in medicines. It is not very big. It grows on mountains and is also cultivated in gardens. It is grown and cultivated almost like barberry.

Pine

190. The tree grows very big and tall in China, in jungles as well as in gardens.

Poplar

191. Poplar is a very lucky tree. Its trunk is very big and its

circumference is very large. It is also very tall and its life is very long. Its saplings grow near its roots and are transplanted. Before growing it, if the lower parts of its branches or the roots of its saplings are crutched a little, it will grow quickly. As it grows bigger and bigger, it requires lesser and lesser care.

192. It is better to grow it on the sides of canals or near gardens.

Sapaidar

193. *Sapaidar* is a kind of white willow, which is very beautiful but fruitless. Like poplar, it also grows very big and is grown like poplar. It is usually grown on the banks of canals and near flowing water.

Willow

194. Willow is not a very big tree. The best time to grow it is spring. It is usually grown on the banks of canals and tanks and at those places where water stays. If it is planted in summer, it should be watered immediately.

195. There are many varieties of willow. Some have yellowish color and some black. Willow tree is very sturdy.

196. One of its varieties is known as musk-willow, from which "aloes wood" (see paragraph **228**) is extracted every year. Smaller its trunk, stronger it is. Trees grafted on this variety produce very delicate and delicious fruits.

Sissoo

197. Sissoo is a kind of tree that is prized for its wood. It grows in saline as well as in non-saline soils. In saline soils it will be white and in non-saline soils it will be black in color. In certain good and strong soils it grows very big, so much so that pillars and doors are made from its wood. It lasts for many years. Its shade is dense and beneficial.

Citron

198. Citron grows very much in hot countries. If grown in winter, it should be protected from cold.

199. It is sown from seeds and also from its saplings that grow near its roots. Its branch can also be grafted on another tree. Hence, it has many varieties, which grow and taste differently in different climates and different countries.

Orange

200. Orange is a fruit of hot countries. It is said that its tree yields fruits for 4–5 years. The longer time it takes, the shorter will be its seeds and the color of its fruits will be orange.

201. If it takes shorter time, its seeds will be bigger and the color of its fruits will be green.

202. If it is to be sown from seeds, the seeds should be from a very ripe orange and two years old. They will produce better fruits.

203. They should be sown in wet and fertile soil, prepared properly with manure, and watered. Its branch can be grafted on quince and guava tree.

Rose

204. If roses are to be grown from seeds, they are sown in meadows.

205. If they are to be grown from its branches, prepare suitable soil for it, and make a channel around it ten yards apart and 4 fingers deep; then get hold of one of its branches which has grown roots, make small pieces and plant them one yard apart from each other and water them. When the soil has absorbed the water, mix some manure and sand in it, and put them near the roots of the plants. Water them well when they begin to flower.

206. Roses can be grafted on other plants also.

Dog rose

207. Dig up one or two-year-old thin saplings of dog rose (*Rosa canina*), which grow around its roots, and plant them. Dog roses can be grafted on apple and peach trees.

Judas tree

208. The Judas plant (*Cercis siliquastrum*) can be grown in the same way as dog roses. It flowers profusely in spring. Its flowers are red. It grows on mountains. It is also grown in gardens as an ornamental tree. Many saplings shoot up near its roots, which may be dug up and planted anywhere. Its branches can be grafted on other trees, particularly on willow.

Gulnar

209. *Gulnar* is a kind of pomegranate tree, but does not bear fruits. Its flower is scarlet in color and has about a hundred petals. It is as big as a rose. It is grown in gardens as an ornamental plant.

Coconut

210. Coconut tree is like a date palm tree, but it has greater height and lesser leaves. Its leaves are broad and its trunk is very smooth. In order to grow it, its fruits are buried in the soil and water is sprinkled on them daily. When they sprout up like onions, they are either left at the same place to grow or planted somewhere else. Their old branches are cut every year so that their trunks may grow stronger.

Banana

211. Bananas are also grown from seeds, but usually they are cultivated from their saplings that grow near the roots. First the soil is prepared properly with manure. Then pits are dug 3–4 yards apart and saplings are planted in them and watered regularly and profusely till they begin to yield fruits.

Sugarcane

212. Sugarcane is grown like plants. It requires plenty of water. It is grown in this manner.

213. Soil is prepared properly as is done for onions and manure is mixed in it. Then trenches are made there. Then six-inch long pieces of fresh sugarcane are planted in the trenches and watered. When the soil absorbs the water, they are watered again.

Cucumber tree

214. Cucumber tree (*Magnolia* sp.) is as big as apple tree, but it has many branches and leaves. It grows in jungles. It is also grown on the borders of gardens and fields. It is grown from seeds as well as cuttings.

Halila

215. *Halila* (*Terminalia* sp.) (a myrobalan type of nut) tree is as big as apple tree. Its branches, leaves, and fruits are almost like those of apple. It is either grown from seeds or from saplings, which grow near its roots. It can also be transplanted and grafted on other trees.

Myrobalan

216. Myrobalan (*Terminalia chebula*) tree resembles apple tree. It grows in jungles as well as gardens.

Marking-nut tree

217. The marking-nut tree is as big as the green berry tree. It has many branches and leaves. It grows mostly in jungles. It can also be grown in gardens from seeds and cuttings; and its saplings can also be planted. Its fruit or seed resembles oak fruit, which becomes black after it dries up. The nut is used by washermen for marking cloths.

Black pepper

218. Black pepper creeper is like a vine and like betel (*Piper*

betle) creepers it grows on other trees. Its leaves are small. Before it ripens, its fruit or seed is white but after it ripens it becomes black. It is cultivated from its branches or saplings that have roots. It is a forest tree but is also grown in gardens.

Clove

219. Clove tree grows in hot countries abundantly. It is said that it resembles betel or jasmine. Its sticky oil like green berry's oil is very invigorating. Some people say that it is like aniseed (seed of anise) or *kasni* (a kind of chicory) grass. Cloves grow in jungles. They can also be grown in gardens.

Nutmeg

220. In height and size nutmeg tree is as big as apple tree, and its fruits are like peaches. When the fruit bark (husk) ripens and becomes hard it is known as nutmeg-bark (*busbasa; jaretri*). It is said that nutmeg-bark is actually its flower and its nut is within it. It grows in jungles and is also grown in gardens.

Cardamom

221. The creeper of cardamom is like that of vine or betel. It is spread over other trees; and its fruits, i.e., cardamoms grow in clusters. It grows in forests and gardens.

Betel

222. A betel creeper is like American (yellow) jessamine creeper. It grows in jungles and gardens. Its saplings shoot up in large numbers at its roots. They are dug up along with the roots and planted at other places. It can be grown from cuttings too. It requires plenty of water and care.

Hyacinth

223. The hyacinth creeper is also like the betel creeper and grows on other trees. It has big leaves and is grown in gardens.

Cinnamon

224. The cinnamon tree is very big and dense. It grows more in China than in India. It grows both in jungles and gardens. Although it is cut every year, it grows up again.

Sandalwood

225. The sandalwood tree is big and dense. In hot countries its color is white and it has fragrance. But on the banks of rivers and on islands its color is black.

Aloes-wood

226. Aloes-wood tree (*Aquilaria malaccensis*; syn. *A. agallocha*) grows in hot countries. It grows in abundance in India, Ceylon, and Java. Its trunk is very big and has many branches. Its flowers are white.

227. When its "veins" and fibers are buried in the ground, the useless and unhealthy ones fall off from it. Then only those healthy and pure ones are left behind and are called "aloes".

228. Some people say that when the branches of aloes tree are cut into pieces, and kept in a river, the useless and soft ones dissolve into the water and the healthy and wholesome ones remain intact. They are then brought out of water and are known as "aloes wood" (see Appendix 1).

Ebony

229. Ebony tree is black and shining. The color of some trees is yellowish black. Its seeds like henna's are red, white, or blackish. It grows in mountain forests. Many beautiful and useful things are made from its wood.

Mango

230. Mango tree is as big as walnut tree. The best season to grow it is the beginning of spring or summer. It grows in all soils.

231. If it is to be grown from seeds, the soil is properly prepared with manure and seeds of good quality of mangoes are sown in it. When their plants become 1–2 years old, they are transferred and planted in the garden.

232. In the other method, at first the soil is properly prepared with manure, then deep pits are dug 20–30 yards apart; they are filled with a mixture of dung and sand, and a few seeds of mangoes are put in each pit and vegetables are sown around them. Sometimes mangoes are grown on the boundaries of fields.

Phalsa

233. *Phalsa* (*Grewia asiatica*) (a kind of small, edible, purple berry) tree is not very big. In size and height it is as big as the hazel tree. If all its branches are cut and burnt, it produces fruits in abundance. In size the fruit is equal to gram (chickpea). Its color is blackish or blackish purple. If eaten with the seeds, it is very invigorating.

Rice

234. Rice is grown mostly in hot countries, and except India, it is grown in the beginning of spring. Its soil is prepared in such a way that one and a half feet of water always remains there.

235. In certain countries, seeds are first soaked in water and when they sprout they are sprinkled in the prepared soil with hand.

236. At certain other places its seeds are sown in a small bed and watered. When they grow six inches high they are planted in the field in a proper order.

237. Rice requires plenty of water but it should not be cold. Hence, its plants are watered with such water, which is soiled and has sand mixed in it.

Wheat

238. Wheat grows in both hot and cold countries. Sometimes

canal water is given to it and sometimes rain water is sufficient. In other words, wheat is sometimes grown in rainfed fields and sometimes in irrigated fields. And at certain places they are grown even without water. Most appropriate soil for them is clayey soil, of black or yellow color.

239. Its soil is softened very much so that the soil may grow less weeds and the crop may get more strength. Fields with high elevation are better for it.

240. Field in which wheat is to be grown is softened very much with a plow driven by four bullocks several times. And before they are sown its seeds are cleaned of other grains, pebbles, and stones so that they may grow easily, gain more strength, and produce more tasty wheat.

241. There are many varieties of wheat such as Sharbati, Banai, etc., etc.

Barley

242. Barley is also grown like wheat, but its growing season is earlier; and it also ripens earlier.

Gram

243. Gram (chickpea) is grown in rainy season because it needs plenty of water, especially if the soil is sandy.

Baqla

244. *Baqla* or *raaj-maan* (*Vicia faba*) (a kind of beans) grows everywhere. If the field where it is to be grown is fertile and vigorous, it does not require water or manure.

245. Because its roots, branches, and leaves have the qualities of manure and it increases the strength of the manure, it is grown among plants. Its flowers are very stinking and harmful; therefore they should be avoided when they blossom.

Millet

246. Millet is also grown like wheat, but it is grown earlier. Its soil requires plenty of manure and is softened up. It is white, black, or red and its spikes are small.

Vetch (?)

247. Vetch (?) (*mash*; black gram ?) is also grown like millet. Its sowing time is the same as that of other vegetables.

Lentil and pea

248. Lentils and peas are grown in the same manner as other pulses and in the same season.

Cotton

249. Cotton is grown in the same season in which paddy is planted. It requires a lot of water and manure. Usually it is also grown like other grains (corn).

250. At some places a hole is dug in the soil and cotton seeds are grown there. Thus they grow better. They grow best in moderate climate and yield better crops.

Linseed

251. Linseed (flax) is sown in autumn. Oil, ropes, and fine linen are made from it. It grows very much in Rome and Europe.

Indigo

252. Indigo plant is sown in the same way as cotton. Its cultivation is very easy, and it yields very early crop.

Sesame

253. Sesame is grown in a similar way as linseed.

Cumin

254. If cumin seeds are sown at high altitudes and watered, they show better results.

Caraway

255. Caraway seeds, like dill seed, aniseed, mustard seed, and poppy seed, are grown and cultivated in the same manner as cumin seeds.

Celery

256. Celery is sown only once. After that it grows by itself.

Lettuce

257. Lettuce seed is sown for medicines. It is also sown at the end of autumn but sown from those seeds only which have been specially prepared for cultivation, otherwise all labor will be lost.

Coriander

258. Coriander can be grown any time but it will be better if it is grown in autumn. It will grow better in rich and fertile soil.

Soya

259. *Soya* (a pot herb) is grown in the same manner as fenugreek, parsley, spinach, etc., etc.

Sudab

260. Like coriander, *sudab* (*Ruta graveolens*) is a kind of grass, which is used in medicines. It is found in hills and jungles. The seed of the wild *sudab* is darker than the mustard seed. It can also be sown in gardens.

Kasni

261. *Kasni* (*Cichorium* sp.; a kind of chicory) grows in jungles. It can also be cultivated in gardens. It is used in medicines.

Parsley

262. Parsley (a kind of yellow flower) seeds are like dill seeds. It is sown only once, because after that it grows itself once a year.

Khas

263. *Khas* (vetiver) (a sweet-scented grass) is grown at the end of autumn. Lettuce is actually its seed. Only that seed is sown which has been specially prepared for propagation. Otherwise the labor will be lost.

Sweet basil

264. Sweet basil grows fragrant flowers. Before sowing it, the soil should be softened and manure and water put in it. Certain basil kinds grow broad leaves and others small. The plant which has small leaves produces flowers which are more fragrant, delicate, and fine. It is called "*Rehan-i-Baghdadi*" (the basil tree of Baghdad).

265. Those basil plants that are grown near brinjal (eggplant) will be stronger and better.

Narcissus

266. Narcissus is grown in hot countries in autumn. It grows very fast and flowers during winter. But in cold countries it is grown in winter. And if it is to be grown in pots, it should be grown in winter. But when very cold wind blows, its pots should be taken inside and brought out if there is sunshine. If it begins to rain heavily when its plants begin to flower, they should be taken out with their roots and hung near a door so that they may become dry; but the middle stem of each plant should keep swinging and it should remain as fresh as it was before and does not wither.

267. Narcissus must produce flowers in the year in which it is grown. A number of its saplings grow near its roots. They should be removed and replanted at other places.

268. If its soil is thoroughly softened and manured, it will grow big leaves and produce more fragrant flowers.

Chamomile

269. Chamomile (*baboonah*) is a kind of grass, which induces sleep. It is grown in autumn. It grows from seeds and spreads very much.

Marshmallow

270. Marshmallow also grows from seeds during autumn. Like chamomile, it also spreads very much on the ground. It too produces saplings that should be replanted.

Balangoo

271. *Balangoo* (a kind of citron) seeds (fruits ?) are used in a cold drink. In hot countries it grows in autumn and in cold countries it grows during spring. It is grown in garden as well as in pots.

Saffron

272. Saffron is grown in summer. First, the soil is carefully prepared and manured. Then its "veins" are cut into small pieces and they are grown in pits, each one-yard deep, and watered profusely for 40 days.

273. When autumn begins and it is the time for the saffron pieces to sprout, they are watered profusely every day for 18 days. And when the weather becomes cold and the saffron flowers begin to bloom, saffron is picked daily from those flowers. This process is continued till snowfall.

274. After this, manure is again put in the saffron fields. They are watered till the end of autumn which is the time when saffron plants sprout. Roots of saffron remain in the soil for 3 to 4 years and produce many saplings, which are either left there or replanted somewhere else.

Melon

275. Moist soil is most appropriate for melons, but it should be

free from other trees and weeds; otherwise it will lose its moisture. Melons sown in saline soil are more sweet. Therefore, selection of proper soil is necessary. Some care should be taken in the selection of its seeds.

276. There are many varieties of melons. Therefore the seeds of different varieties should be separated from each other. Seeds that grow early should be sown first. Seeds of sweet melons will produce sweet melons.

277. Hoeing of melon fields is necessary. Roots of melon plants must be covered with earth once or twice. Earth from old walls and ruins, etc. will be better. Certain low-lying fields are watered throughout winter so that they remain saturated with water. Seeds should be sown when the soil has absorbed the water. If seeds are sown in this manner, the soil will not need manure and water any more.

278. Sometimes during spring the fields and pits are watered profusely, and when the water gets absorbed in the soil it is upturned slightly with pickaxe, and a few melon seeds are sown there and covered with soil.

279. When 3 to 4 leaves (seedlings ?) appear the plants are covered with clayey soil. And if 3 to 4 leaves appear together at one place, all are removed except one.

280. If the soil is bad, a mixture of manure, sand, and sugarcane leaves will do.

281. To protect melons from cold or heat, these are covered with big earthen pots.

Cucumber

282. Cucumber is also more or less grown like melons. The best season for it is spring. It must be protected from extreme cold or heat.

Pumpkin

283. Pumpkin is also grown in the same way as melon. It is usually grown near house walls or along boundaries of gardens. It grows as a creeper. There are many varieties of pumpkin, round as well as long, but the best one is "sugar pumpkin". It is round and has sugary taste.

Brinjal

284. Brinjal (eggplant) can be cultivated three times a year. The soil should be like melon's. Its seeds are sown in a small bed. When the leaves of its plant become a little big, they are transplanted to other places.

285. There are many varieties of brinjal; white, purple, round, long, sweet, bitter, juicy, soft, and thick.

Cabbage

286. Cabbage is grown in cold and damp climates. Its sowing time is the same as that of cotton seeds. It requires very rich soil. Its seeds are sown in beds or seedlings are grown. They are later transplanted.

Beet root

287. Beet root is grown in autumn. First, its seedlings are grown. When their leaves become big, they are uprooted and the plants are transplanted to a new place. In order to grow big-sized beet root, dig rather big pits, put in them a mixture of dung, earth, and grass; and when they grow, break some of their branches so that the roots may gain more strength.

Carrot

288. Carrots, like turnips and radish, are grown in the same way as beet roots. If old soil is mixed in carrot's soil and watered daily, carrots will become long.

289. Carrots are grown from seeds but should not be sown in

the soil more than one inch deep. Cowdung is the best manure for them. The plants should not be watered too much; otherwise the sweetness of carrots will be reduced. Carrots are grown sometimes in spring and sometimes at the end of summer.

Onion

290. Onions are usually grown in autumn. To grow these, soil is softened and manure is mixed in it. Then seedlings are grown. When the seedlings grow up a little, they are grown in the fields in lines, and watered profusely. During summer they are watered for 40 days.

Garlic

291. Garlic is also grown in autumn. The plants grow in all soils and all types of manure suit them. Cloves of garlic are planted and watered immediately. Second dose of manure is administered when cold winds blow.

292. Garlic can be grown from seeds also but then the plants will not grow high.

293. As the soil becomes vigorous when garlic plants are grown in it, they are grown in between other plants.

Some general observations

294. If vetch (?) (*mash*; black gram ?) and lentil are smeared with cowdung and grown, they will grow faster.

295. If bean seeds are soaked in hot water for 24 hours and sown, their seeds will be big.

296. Similarly, if gram (chickpea) seeds are soaked in hot water for 24 hours, they will grow bigger gram seeds.

297. If gram seeds are mixed with a few walnut seeds and grown, the walnuts will ripen quickly.

298. If Egyptian beans are soaked in water for three days and

nights and sown, their bitterness will become less.

299. Some farmers say that if the seeds of wild beans are sown on the edge of a mountain, their produce will be better.

300. And some farmers say that if these seeds are sifted with a sieve made from the leaves and branches of the wild beans, which has thirty holes in it through which a human finger can pass and sprinkled over the fields, one fourth of them will grow faster than the others.

301. If lentil seeds are mixed with other seeds and sown, whatever calamity occurs it will fall only on the lentil crop and crops of other seeds will be saved.

302. It is said that if pomegranate and guava trees, which are "very friendly" with each other are planted near each other, both will yield more fruits.

303. Similarly, if pistachio and almond trees are planted near each other, they will yield more fruits.

304. If a pomegranate tree is weak and is to be protected from the cold weather, it should be covered with the leaves and branches of a pumpkin creeper; the cold weather will not cause any harm to it.

305. All plants and trees should be looked after in this manner.

The End

This book "The Art of Agriculture" written in the month of *Zelqadha* 1207 hijri copied from the book Ganj-e-Badawar compiled by Dara Shikoh in which the science of medicine, etc. is also mentioned.

About the Translator

Dr Razia Akbar had a brilliant academic career. She obtained her MA degree in Persian from Osmania University, Hyderabad, India and PhD in Persian from Teheran University, Teheran, Iran. She has had a distinguished professional career spanning over 38 years and retired in 1982 as Chairperson of the Department of Persian, Osmania University, Hyderabad. She distinguished herself by participating in many international seminars and conferences and receiving several recognitions for her scholarship. In 1991, she received the President's Award (Government of India) for her contribution to Persian literature.

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Commentaries

Commentary

K L Mehra[1]

The text, The Art of Agriculture, written in Persian deals with the art of cultivating economic plants. It provides information and recommendations for undertaking cultivation of economic plants in both 'dry-lands' and 'wet-lands', and in different seasons and agroclimatic conditions. Information is provided on time and methods of sowing/planting, materials for planting, soil ingredients, water requirements, and other cultural practices for optimal growth of many economic plants. The text gives details of plant species for use as stocks and scions of several fruit trees.

The text refers to about 100 plant species. The Persian names and English names of some species refer to more than one botanical epithet. The Persian names given in the text are those that were used three centuries ago at the time of writing the text. Therefore, efforts were made to contact botanists of Iran, India, and Europe in addition to comparing the Persian plant names used during the Mughal period in India. Botanical names of some plants could not be traced. The English, Persian, and botanical names of plants mentioned in the present manuscript are given in Table 1.

The text deals with plant species which can be grown in subtropical and temperate climates. It covers cereals (wheat, barley, rice), millets (*Panicum* spp.), legumes (lentil, pea, chickpea), oil-yielding plants [sesame, linseed (flax), coconut], fiber-yielding plants (cotton, flax), spices and condiments (caraway, coriander, cumin, parsley, celery, clove, dill, nutmeg, black pepper), sugar-yielding plants (sugarcane, beet root), vegetables [brinjal (eggplant), cabbage, carrot, pumpkin,

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cucumber, onion, garlic], dry fruits (almond, pistachio, walnut), fresh fruits (apple, apricot, mulberry, mango, peach, plum, banana, muskmelon, pomegranate, grape, jujube, orange, guava, olive), ornamental plants (rose, narcissus), and timber trees (pine, poplar, willow, sissoo, ebony).

The economic plants are mostly of the Old World origins except guava of the New World. Europeans introduced several New World crops into India since the arrival of Vasco da Gama at Calicut in South India on 20 May 1498. The author of the present text did not select New World crops for this text. Perhaps those plant species except guava had not yet become so popular in India. Interestingly, the author included plant species of Southeast Asian origin (nutmeg, clove), Mediterranean origin (fig, olive, onion, garlic, lettuce, parsley), West Asian or Southwest Asian origin (walnut, pistachio, date palm, apple, apricot, plum, mulberry, pomegranate, wheat, barley), and Indian origin (brinjal, cucumber, rice, black pepper, betel, cinnamon, mango, banana, sugarcane, cotton). The cultural contacts between India, West Asia, Central Asia, China, and Southeast Asia had continued for more than 1500 years before the present text was written. Obviously, during this period several plant species were introduced from these regions into India, and these plants played an important role in the agri-horticultural economy of India. Hence, the author may have decided to provide recommendations for cultivating such plant species.

Table 1. English, Persian, and botanical names of plants mentioned in the Persian manuscript.[1]

English name	Persian name	Botanical name
Palm tree, date palm	*Khurma* *(khorma zard)*	*Phoenix dactylifera* L.
Vine, grape, grapevine	*Tak* *(dakh, angur)*	*Vitis vinifera* L.
Fig	*Injir* *(anjir)*	*Ficus carica* L.
Olive	*Zaitoon* *(zaitun, zeytoun, derakht-e-zeytoun)*	*Olea europaea* L.
Pomegranate	*Anar*	*Punica granatum* L.
Apple	*Seb*	*Malus pumila* Mill.
Guava	*Umrood*	*Psidium guajava* L.
Quince	*Behi*	*Cydonia oblonga* Mill.
Peach	*Shaftaloo*	*Prunus persica* (L.) Batsch var. *persica*
Damson	*Aluchah, aloo-bukhara*	*Prunus insititia* L.
Apricot	*Zord-aloo*	*Prunus armeniaca* L.
Mulberry, black mulberry, white mulberry	*Toot* *(shah-tut, tut, derakht-e-toute)*	*Morus nigra* L. (black), *Morus alba* L. (white)
Khartoot[2] (Himalayan mulberry)	*Khartoot*	*Morus serrata* Roxb.
Plum	*Aloo-baloo* *(albalon, aloo-bukhara, alony-e-abouli)*	*Prunus domestica* L.
Oak	*Baloot*	
King oak	*Shah-baloot*	

continued

Table 1. *continued*

English name	Persian name	Botanical name
Almond	*Badam*	*Prunus dulcis* (Miller) D.A. Webb (syn. *P. amygdalus* Batsch)
Walnut	*Girdgan*	*Juglans regia* L.
Pistachio	*Pistah (pestch, pesteh-vahshi)*	*Pistacia vera* L.
Hazelnut, hazel	*Funduq (findah)*	*Corylus avellana* L.
Jujube	*Unab*	*Ziziphus mauritiana* Lam.
Glutinous berry	*Sapistan*	*Cordia obliqua* Willd.
Ambergris (?)	*Umber*	
Shajar-ul-zaroor[2]	*Zaroor (shahur-ul-zaroor)*	
Kandas[2]	*Kandas*	
Green berry	*Habbatul-khizra*	
Ermine (?)	*Moorid, alas (mooro)*	*Ulmus wallichiana* Planch. (?)
Barberry	*Zaraashk*	*Berberis vulgaris* L.
Myrtle	*Hina (jena)*	*Myrtus communis* L.
Sumach	*Sumaq*	*Rhus coriaria* L.
Pine	*Sanaubar*	*Pinus halepensis* Mill.
Poplar	*Chanar*	*Populus balsamifera* L., *Populus nigra* L. (black poplar)
Sapaidar[2]	*Sapaidar*	
Willow, white willow	*Bed*	*Salix alba* L.
Musk-willow (Indian willow)	*Bed-e-mushki (bed meshq)*	*Salix tetrasperma* Roxb.

continued

Table 1. *continued*

English name	Persian name	Botanical name
Sissoo	*Shisham, kej*	*Dalbergia sissoo* Roxb.
Citron	*Turanj*	*Citrus medica* L.
Orange	*Naranj*	*Citrus aurantium* L.
Rose	*Gulward*	*Rosa foetida* Hermann
Dog rose	*Nasrin, nastaran*	*Rosa canina* L.
Judas tree	*Arghwan*	*Cercis siliquastrum* L.
Gulnar	*Gulnar*	
Coconut	*Narjil, jauz-e-hindi*	*Cocos nucifera* L.
Banana	*Mauz, kela*	*Musa* spp.
Sugarcane	*Naishakar*	*Saccharum* spp.
Cucumber tree	*Kheyar*	*Magnolia* sp.
Halila[2]	*Halelah*	*Terminalia* sp.
Myrobalan	*Halelah*	*Terminalia chebula* Retz.
Marking-nut tree	*Balazir*	*Semecarpus anacardium* L. f.
Black pepper	*Philphil*	*Piper nigrum* L.
Clove	*Qaranfal*	*Syzygium aromaticum* (L.) Merr. & Perry
Nutmeg	*Jauz*	*Myristica fragrans* Houtt.
Cardamom	*Ilaichi*	*Elettaria cardamomum* (L.) Maton
Betel	*Tambol*	*Piper betle* L.
Hyacinth	*Sumbul*	
Cinnamon	*Dar-chini*	*Cinnamomum zeylanicum* Blume
Sandalwood	*Sandal*	*Santalum album* L.
Aloes-wood	*Ood*	

continued

Table 1. *continued*

English name	Persian name	Botanical name
Ebony	*Abnoos*	*Diospyros ebenum* Koenig
Mango	*Amba*	*Mangifera indica* L.
Phalsa[2]	*Phalsa*	*Grewia asiatica* L.
Rice	*Berenj*	*Oryza sativa* L.
Wheat	*Gandum*	*Triticum aestivum* L.
Barley	*Jaw* *(jau)*	*Hordeum vulgare* L.
Gram, chickpea	*Nakhud*	*Cicer arietinum* L.
Baqla[2]	*Baqla*	
Millet	*Arzan*	*Panicum miliaceum*
Vetch (?)	*Mash*	*Vigna aureus Roxb.*
Lentil	*Adas*	*Lens culinaris* Medic.
Pea	*Karsana*	*Pisum sativum* L.
Cotton	*Pumba*	*Gossypium* spp.
Linseed, flax	*Tukhm-e-katan*	*Linum usitatissimum* L.
Indigo	*Neel*	*Indigofera tinctoria* L.
Sesame	*Kunjad*	*Sesamum indicum* L.
Cumin	*Zira*	*Cuminum cyminum* L.
Caraway	*Shah-zira*	*Carum carvi* L.
Celery	*Karfas*	*Apium graveolens* L. var. *dulce* (Mill.) D.C.
Lettuce	*Kahoo*	*Lactuca indica* L.
Coriander	*Guishniz*	*Coriandrum sativum* L.
Soya[2]	*Soya*	*Anethum sowa* Kurz, *Anethum graveolens* L.
Sudab[2]	*Sudab*	
Chicory	*Kasni*	*Cichorium intybus* L.

continued

Table 1. *continued*

English name	Persian name	Botanical name
Parsley	*Jafari*	*Petroselinum crispum* (Miller) Nyman ex A.W. Hill (syn. *P. sativum* Hoffm.)
Khas[2], vetiver	*Khas*	*Vetiveria zizanioides* (L.) Nash
Sweet basil	*Raihan*	*Ocimum basilicum* L.
Narcissus	*Narjis, nargis*	*Narcissus tazetta* L.
Chamomile	*Baboonah*	
Marshmallow	*Khatmi*	*Althaea officinalis* L.
Balangoo[2] (citron)	*Balangoo*	*Citrus medica* L.
Saffron	*Zafran*	*Crocus sativus* L.
Melon (muskmelon)	*Kharboozah*	*Cucumis melo* L.
Cucumber	*Khyar*	*Cucumis sativus* L.
Pumpkin	*Kadoo*	*Cucurbita maxima* Duch.
Brinjal, eggplant	*Badan-jan*	*Solanum melongena* L.
Cabbage	*Kalam*	*Brassica oleracea* L. var. *capitata* L.
Beet root (beet)	*Chuqander*	*Beta vulgaris* L.
Carrot	*Zardak*	*Daucus carota* L.
Onion	*Piyaz, basal*	*Allium cepa* L.
Garlic	*Seer*	*Allium sativum* L.

1. English and Persian names are mentioned in the English translation and Persian text respectively; other common names that are not mentioned are given in parentheses.
2. Persian names used in the English translation.

Commentary

K L Chadha[1]

The text, The Art of Agriculture,[2] contains extremely valuable information on a wide variety of fruits, nuts, vegetables, and ornamental, medicinal, forest, and field crops. While the basic operations of propagation and cultivation of most of the plants have not changed much, several statements and recommendations made in the text may not stand scientific scrutiny.

Introduction (1). It has been indicated that the usefulness of leguminous crops (in this case 'beans') was well-known even in the earlier times.

Fields without weeds (5, 6). It is reported that a weeding knife made of copper will prevent the weeds from growing again. This recommendation needs to be confirmed. Weeds are perhaps smothered due to some toxicity (?) caused by the use of copper knife. The value of decomposed plant parts in replenishing the fertility of the soil was well-known and recommended.

Best time for planting trees (8, 9, 10). Autumn planting of trees is not recommended even today as trees establish best in spring and rainy season. Temperate plants, however, may establish well in winter. The view about growth and productivity of fruit trees in relation to their planting at different phases of the moon is interesting but needs to be checked through proper experimentation.

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[2] The Persian text "Nuskha Dar Fanni-Falahat" does not have paragraph numbers. However, in the English translation "The Art of Agriculture", paragraphs have been numbered to facilitate the work on commentaries. These paragraph numbers are indicated in this commentary in **'bold'** font.

Transplanting big trees (11 through 15). Transplantation of large trees is followed only in case of landscaping of some buildings or parks. This practice is very common in resource-rich countries such as USA. Full-grown trees are not transplanted in India except in special cases. However, this practice apparently was common in the olden days. It is evident that the pitcher method of irrigation, i.e., drip irrigation was recommended and followed for growing fruit trees a few centuries ago.

Destruction of trees (16, 17, 18). The practice suggesting the use of chewed lentil or ashes of an old horn of a sheep for drying up of trees needs verification. Today such objectives are achieved by using growth retardants or herbicides such as 2,4-dichlorophenoxy acetic acid (2,4-D). The recommendation made in the text seems to be quite primitive and laborious and needs verification.

Seedless pomegranate (19, 20). The techniques recommended for obtaining seedless pomegranate and avoiding cracking in pomegranate fruits, include making a slit on the tree trunk and disturbing the pith, placing pebbles, or placing squill (*Urginea maritima*). These techniques are unknown today and need to be verified. "Seedlessness" of a variety or fruit is either a varietal character or is governed by pollination status, e.g., parthenocarpy, stenospermocarpy, etc. Similarly, cracking is either a varietal character or is a consequence of water imbalance in plants.

Thin husk of walnut (21). While wrapping of walnut kernel in cloth or in poplar leaves may keep away insects from eating the kernel, the claim that the husk of the fruit will be thin does not seem scientifically tenable as such characters are primarily varietal. Further the statement that even if walnut is sown as it is, its husk will be thin contradicts the earlier statement.

Grafting (22, 23). The process of grafting operation reported justifies the antiquity of the recommendation as it reveals that grafting knives were not available at that time, and that the operation of grafting was performed with a bamboo spike. The recommendation that the grafting should be done in the waning light of the moon is tenable even today as the grafting operation is recommended to be done in the cool hours and in the afternoon to avoid quick drying of grafts.

Grafting time (24, 25). The grafting time recommended does not tally with the recommendations of today. Grafting operation is normally recommended in spring or summer/rainy season in tropical and subtropical plants and winter in temperate plants. Very little grafting is done during autumn.

Trees that can be grafted together (26 through 38). Compatible combinations of scion and stock are indicated as follows:

Fig on apple; guava on mulberry; apple on mulberry; apricot on almond and vice-versa; orange on apple; orange on mulberry; pomegranate on orange; almond and pistachio on green berry; vine (grapes) on apple; peach on apple; and peach on willow. In general, for commercial cultivation compatible scion and stock combinations are prepared only within species and sometimes between the species in the same genus. As such, some of the combinations such as apricot on almond and vice-versa are commercially tried even today. Further, none of the other combinations is being followed commercially anywhere. This information in the text therefore is quite interesting and needs verification. If found correct, it can prove very useful in widening the base of root stocks used for different fruits and trees mentioned above. However, its authenticity seems questionable at present.

These paragraphs also mention some beliefs as follows:

If a branch of guava is grafted on mulberry tree the fruits of guava will be red. Similarly, if a branch of apple tree is grafted on mulberry tree, the fruits of apple tree will be red **(27)**.

If the orange tree is grafted on apple tree, it will produce red oranges **(30)**.

If a vine is grafted on apple tree, it will produce more grapes than other vines **(33)**.

Fruits produced from peach trees grafted on willow will be seedless **(35, 36)**.

If you want to make peaches sweet, take one seed each of quince and almond, remove their pith and place it in the pith of peach and sow; the fruit of this peach tree will be very sweet **(37)**.

If the rose is grown near a peach tree, the fruit of this peach tree will be sweet-smelling **(38)**.

All the above beliefs cannot be explained scientifically and thus need verification.

Preservation (39 through 43). The first part refers to low-cost storage of quince under the ground for a period of one year. Low-cost storage of fruits and vegetables for specific periods has also been recommended in India. It is not known in what region this underground storage was tried. In case it was tried in hilly areas (temperate region) where the underground temperatures are comparatively very low, this may be possible as there are cases of storing apples in basements of houses in temperate regions of India from several months up to one year depending upon the altitude of the location. The practice of using melted marine pitch to the roots of bark trees for improving their keeping quality is unknown in the present-day agriculture. Similarly, the role of salt in improving the sweetness of fruit is not a commercially recommended practice anywhere in the country. The role of potassium application in improving the quality of fruit, e.g., total soluble solids, etc. has been reported in many fruits though no work has been done on the role of sodium salts.

The practices recommended for preserving flowers (lily, rose) are not in vogue in current agriculture and their validity needs to be tested.

Palm tree (44 through 48). The information given in the first para **(44)** is by and large correct. Flowers of both the sexes are borne by the trees and are important for fruit bearing. Importance of taking a seed of a good variety was appreciated. The statement that both male and female trees will grow fruits when crossed is somewhat misleading.

Vine (49 through 70). The importance of pruning for getting good fruit yields in vines was well-known. Cultivation of grapes both in temperate and tropical conditions was known at that time though it is generally believed that tropical grape cultivation has been popularized in India rather recently. It is stated **(51)** that good soil for grapes would be that which when taken from one-yard depth and mixed with rain water would "taste like grapes and wine". This claim needs to be verified.

The practice of training grapes on stakes, etc. was known at that time **(53)**. Further, while most grapevines were propagated from cuttings, grafting of vines was also known and followed **(59)**.

The role of sandy soils in producing good quality grapes is in order **(61)**. The recommendation about producing grapes of different color is not scientifically tenable **(62)** unless of course the author intended to suggest getting grapes of different colors from the cuttings planted in the same pit. The practice of producing seedless grape does not seem to be scientifically sound **(63)**. Use of opium, cow's urine, milk of she-ass and the subsequent effect of the leaves of such vines on snakebite do not appear scientifically sound, but cannot be dismissed merely as figment of imagination **(64, 65)**. The role of certain mixtures of plants in the pit of vine to ward off insects needs verification **(66, 67)**. The recommendation concerning the use of a concoction of burnt nitre (potassium nitrate) also needs verification. Likewise, the recommendation of growing vine and plum together seems interesting and needs verification **(69)**.

The use of garlic paste and oil in controlling insect pests seems in order **(70)**.

Fig (71 through 82). The practice of soaking fig cuttings in salt water for 3 days is an interesting recommendation worth confirming **(74)**. Production of lighter and tastier fruits on fig trees produced from cuttings planted and kept tilted to a side is also an interesting recommendation **(77)**. Application of eggs (poultry) for production of more figs and sprinkling of pounded leaves of olive for producing more figs also needs verification **(78)**. Ripening figs faster than normal by use of bird droppings mixed with the dust of black pepper needs to be checked **(81)**. The statement that words or figures etched on the roots of a fig tree, show up in its fruits points more towards a magical happening and is unacceptable **(82)**. Similar claim has been made in case of almonds **(155)**.

Olive (83 through 94). The recommendation to keep the pits open for a year **(85)** for exposure to air and heat before planting olive seems unnecessary since the same effect can be achieved by keeping the pits open for a month or two during the hot summer prior to planting. A two-month period for solarization of soil is considered adequate. The recommendation to push fruit-bearing branches through a hole in the trunk for making the olive produce more fruits does not seem to have a sound scientific basis **(88)**. The practice of placing grass at the bottom of pits prior to planting **(89)** seems to be alright as the moist grass helps in root regeneration. The recommendation to increase fruiting **(91)** and reduce fruit-drop **(92)** do not seem to have scientific basis, and need to be checked. Grafting of olive on a vine or apple is recommended as fruits are produced having the flavor of grape or apple respectively **(94)**. This recommendation lacks scientific basis.

Pomegranate (95 through 105). The correct recommendation for cutting the branches is to cut with a knife or blade and not to break them physically to ensure a uniform cut without damage to branches. The recommendation made in the text to avoid knife and break the branch by hand is not scientifically tenable **(97)**. The claim about using different root stocks does not seem to be scientifically viable because of the wide genetic differences among the species indicated **(100)**. It is difficult to accept the claim that the color of the pomegranate fruit would be improved by smearing the slit branches with earth and cowdung. Color is a varietal character **(101)**.

Apple (106 through 111). Insect-repellent action of sheep droppings and pig's dung mixed with man's urine needs to be confirmed **(108)**. Likewise, the recommendations on the use of donkey's dung **(109)** and the effect of use of sediments of old wine on color of apples **(110)** need to be verified. It is not possible to agree with the recommendation of grafting apple on citron **(111)**. Also, whereas apple is a temperate zone fruit, citron is a tropical/subtropical fruit.

Quince (116 through 119). The recommendation **(118)** that "whenever it is watered, one and a half yards of its trunk should remain submerged in water" seems to be impractical and not based on scientific reasoning. Likewise, the recommendation on grafting quince on willow or jujube tree is unacceptable **(119)**.

Peach (120 through 126). The recommendation **(126)** about grafting peaches on varied trees is scientifically unacceptable.

Mulberry (131 through 138). The change from black to white mulberries and vice-versa through grafting needs to be verified **(137)**.

King oak (144, 145, 146). Compatibility of oak with guava and apple is not reported and therefore the claim made cannot be accepted **(146)**.

Almond (147 through 155). The statement "Almond trees grow in hot countries" is incorrect because primarily almond is a plant of temperate region **(148)**. The claim that bitter almond when grafted on sweet almond tree will produce sweet almond does not sound scientifically correct. Normally, sweet almonds are grafted on bitter almond, which is only used as a root stock **(154)**.

Walnut (156 through 163). The claim about the effect of old wine and urine of children on the husk of the fruit needs to be verified **(157)**. Likewise, the suggestion of wrapping kernel in wool before sowing to obtain their husk needs to be tested scientifically **(158)**. Again the claimed effect of iron on the yield and quality of husk needs to be verified **(160)**. Compatibility of walnut with plants like almond as root stock has never been reported. The recommendation **(163)** to produce bunches of walnut does not make scientific sense.

Jujube (169, 170). The statement that jujube can be grafted on apple, guava, or quince does not seem scientifically correct **(170)**.

Orange (200 through 203). The recommendation that seeds should be collected from very ripe orange and plants should be 2-year-old to get "better fruits" needs to be scrutinized scientifically **(202)**.

Sweet basil (264, 265). The statement that basil plants grown near plants of brinjal (eggplant) "will be stronger and better" needs to be verified.

Many recommendations in the text make sense and are not different from those made today. However, a large number of recommendations need to be reviewed critically and some can be tested scientifically.

Commentary

J S Kanwar[1]

The text, The Art of Agriculture,[2] is neither an exhaustive manual for growing crops nor a treatise based on any well-planned research as we understand today. However, it is very creditable that the author has briefly given important tips related to techniques of growing nearly one hundred crops of economic importance, mostly fruit and vegetable crops, and some cereals, legumes (pulses), flowering and medicinal plants, and trees. One can easily conclude that the information given in the document is based on the plants/crops that were widely grown in Central Asia, Turkey, Iran, and erstwhile northern India (now includes Pakistan). Advisors of the author Dara Shikoh had probably traveled widely or collected information from various sources including field-crop farmers, fruit and vegetable growers, and users of herbs and medicinal plants. The plants described in this document cannot be introductions made during the periods of Babur (1526–1530) and Jahangir (1605–1627). It is likely that most of these plants were already under cultivation in India.

It does not seem necessary to comment on all the statements and recommendations made in this text as most of the agronomic practices described are too well-known and are in use in the present-day agronomy and horticulture. However, observations on some of the agronomic practices and the soil management techniques should be of interest to modern farmers and research scientists, and are therefore briefly commented upon.

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2. The Persian text "Nuskha Dar Fanni-Falahat" does not have paragraph numbers. However, in the English translation "The Art of Agriculture", paragraphs have been numbered to facilitate the work on commentaries. These paragraph numbers are indicated in this commentary in '**bold**' font.

Dryland agriculture (1). It is stated that the drylands which do not support a good crop can be made more productive if "Egyptian variety of beans" is grown on such lands for a year or so. This observation reveals an understanding of the importance of growing legumes under conditions of moisture-stress. The name Egyptian bean probably refers to faba bean (*Vicia faba* L.) which is one of the most important beans widely cultivated in Egypt and West Asia even today. Its importance in adding a large biomass and ensuring nitrogen fixation is well understood. It is known as *baqla* in the submontane districts of the Indian states of Punjab and Uttar Pradesh (Terai areas). The author has in fact used the name *baqla* in the text.

Best time for sowing crops (2, 3, 4). The practice of early, mid-season, late season, or periodic sowing of crops is based on a strategy for matching the vagaries of monsoons. It is a wise strategy of providing insurance against risk of losing crops and is adopted today in all dryland areas.

Weed control (5, 6, 7). Destruction of weeds at a time when the Sun is in the zodiac sign Gemini (May 21–June 21), which is the hottest season in North India, is a sound recommendation. Weed control is also effective when the Sun is in Virgo (August 23–September 22); this seems to be based on the observation that during this period growth of weeds is maximum and these are in their most vulnerable phase of life. Eradication of weeds at this stage is physiologically and scientifically correct. An interesting reference is to the use of a weed-cutting knife with a copper blade; this is probably based on the knowledge of toxicity of copper to plant roots. The synchronization of practices with the zodiac is based on practical observations regarding the best time for controlling weeds effectively.

Best time for planting of trees/horticultural plants (8, 9, 10). The best time for planting trees is when the Sun is in Libra (September 23–October 23), Pisces (February 19–March 20), or

Aries (March 21–April 19). Even today this is the usual practice with the horticulturists, gardeners, and foresters. The observation that planting in spring leads to more vigorous growth and in autumn to stunted growth is also a well-known fact.

Destruction of trees (16, 17, 18). One technique described is branding the tree roots with a hot iron rod. This is easily understandable. The other is biting the branches of a tree with well-chewed lentils in the mouth; this one is difficult to explain. It requires verification.

Producing seedless pomegranate (19). The technique of making a long slit, removing and then "remixing" the pith, and then covering it with clay has been suggested for producing seedless pomegranates. The technique needs to be verified.

Control of cracking of pomegranates (20). The technique suggested is based on use of pebbles around the trunk of the young tree or putting sea-onion or squill (*Urginea* sp.) under the roots and planting it slanted to one side. It is claimed to eliminate the problem of fruit cracking. The present-day knowledge tells us that cracking is due to nutritional deficiencies and application of substances that supply full amounts of calcium, potassium, sulfur, and phosphorus may correct this malady. Whether the recommendation of the author of the text achieved rectification of nutritional deficiencies needs verification.

Control of pests of walnut (21). It is mentioned that if a walnut is cracked and the kernel is wrapped in a woolen cloth or in leaves of poplar before sowing, it would prevent insect damage. Also, the husk of the fruit from such a tree will be thin. This claim needs to be verified, although insect-repellent property of poplar is well-known.

Preservation of fruits and flowers (39 through 43). Preservation of quince, apple, and apricot by placing them in deep pits is suggested. This technique is followed even today in the Lahaul valley of the state of Himachal Pradesh and other snowfall-prone areas of India. All fruits, vegetables, tubers, and cereals in rural areas are preserved this way for long periods.

Cultivation of palms and grapevines (44 through 70). The use of common salt for palms, and drip irrigation and use of deep trenches for subsoil irrigation are well-known practices. Drip irrigation is practiced in grape cultivation in areas such as Baluchistan (Pakistan), which was the home of seedless grapes called the famous Chaman grapes. Use of earthen pitchers with fine holes **(14)** is an extension of the same principle in use in horticulture in the states of Rajasthan and Maharashtra in India.

The recommendation that spraying a thick concoction of burnt nitre and water on the branches of grapevines will help in producing early fruiting **(68)** seems to be supported by the present-day practices. Insecticidal effect of garlic **(70)** has been confirmed in recent years. However, the recommendation **(70)** about the effect of pruning with a knife smeared with melted fat, or application of garlic paste and oil, or dust prepared from dried leaves of vine and applied to the roots of the grapevines to prevent incidence of pests needs verification.

Fig (79). To prevent fruit fall, use of salt and mulberry vinegar is recommended. This might mean that salt and acetic acid (vinegar) ameliorate the deficiency of certain nutrients from the soil which prevents fruit fall.

Pomegranate (101). The recommendation to slit a pomegranate branch, take out the pith, and fill with cowdung and earth and tie with a string to enhance red color of the fruit and its quality needs to be investigated.

Grafting (100, 105, 111, 115, 119, 126). The suggested root stocks need to be checked for their success in grafting pomegranate, apple, guava, quince, peach, etc.

Field crops (243). It is mentioned that gram (chickpea) is sown during rainy season as it requires a lot of moisture. The reference is probably to "kabuli" chickpea of the Mediterranean region where it is grown during (rainy) winter and not to the gram ("desi" chickpea) crop in India, which is grown in the postrainy season on receding moisture. It is possible, however, that the author is referring to black gram (*Vigna mungo* (L.) Hepper), which is grown during rainy season in northern India. If the latter view is accepted, it indicates that the author was a Western traveler who used the term "gram" for any pulse crop. As mentioned earlier another legume called *baqla* **(244)** is probably the same as Egyptian bean or *Vicia faba*. I recall that faba bean was called *baqla* in the Punjab, but it is not cultivated anymore.

Creeper and trees (223, 225, 226). Interesting observations relate to hyacinth, sandalwood, and aloes-wood. It is stated that hyacinth is a creeper just as betel creeper and grows on other trees. It has big leaves and is grown in gardens. It is clear that this is not the water hyacinth (*Eichhornia crassipes* Solms) that we know today and which has become an obnoxious weed. The hyacinth that the author refers to is likely to be a creeper grown for ornamental purposes in gardens.

In case of sandalwood it is stated that the "tree is big and dense. In hot countries its color is white and it has fragrance. But on the banks of rivers and on islands its color is black." The first type is the sandalwood grown presently in Karnataka in southern India, but what the author means by black sandalwood is not clear. Did it exist in India and has now become extinct?

Aloes-wood grows abundantly in India, Ceylon (Sri Lanka), and Java (Indonesia). When its "veins" (?) and fibers are buried in the ground the useless and unhealthy ones fall off, and only healthy and pure ones survive which then is called the "aloes wood" **(227)**. Its commercial value is being realized now.

The author's observations do not seem to be confined to India. The document reveals the author's (advisors') wide knowledge of agriculture of other countries as well, most probably of the West Asian temperate and Mediterranean regions.

Commentary

Y L Nene[1]

Compilation of information

The colophon clearly states that the "book" The Art of Agriculture[2] was copied from a bigger "book" Ganj-e-Badawar, compiled by the Mughal prince Dara Shikoh, son of Shah Jahan who built the Taj Mahal. The bigger "book" also contained information on the "science of medicine". It is well-known that Dara Shikoh was a great scholar; theology interested him most. It would be an extravagant assumption that he possessed knowledge of every known science of the 17th century. Thus it would be safe to assume that Dara Shikoh consulted a person or persons who possessed deep knowledge of the science and art of agriculture. Whether the consultants were born-residents of India or they were invited from outside India is an interesting issue. The answer may be found in discussion on the next topic.

Topics in the text: What do these indicate?

The text briefly describes the "art" of growing about 100 economic plant species. These include trees (fresh fruit, dry fruit, avenue, timber), shrubs of ornamental significance, vegetables, cereals, legumes, oilseeds, and aromatics. Species are grouped on the basis of similarities and the general sequence followed is: fresh fruit trees, dry fruit trees, berry-producing plants, avenue and timber trees, flowering shrubs, plantation crops, spices, aromatics, cereals, legumes, fiber crops, and vegetables. However, the sequence has not been followed strictly.

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2. The Persian text "Nuskha Dar Fanni-Falahat" does not have paragraph numbers. However, in the English translation "The Art of Agriculture", paragraphs have been numbered to facilitate the work on commentaries. These paragraph numbers are indicated in this commentary in '**bold**' font.

As pointed out in the English translation, paragraphs have been numbered for convenience. If the number of paragraphs under each plant species is taken as a rough indicator of the depth of knowledge of person(s) who advised Dara Shikoh, then it can be noted that a few species stand out. Vines are covered in 22 paragraphs, followed by olive and fig – 12, pomegranate – 11, almond and walnut – 9, mulberry – 8, and peach and melon – 7. All others are covered in less number of paragraphs. A little over 50 species, i.e., half of the species included in the text, are covered in only one paragraph each. Several species of great importance to India are covered very briefly; e.g., mango – 3, sissoo – 1, coconut – 1, banana – 1, sugarcane – 2, and cotton – 2. This can be taken as a strong indication that the person(s) from whom Dara Shikoh obtained information had far more experience in West Asia/Mediterranean regions than in the Indian subcontinent. However, Dara Shikoh made an effort to include a wide range of species to make the text a virtual compendium.

Of all the species included, the author has labeled only the first five; viz., palm tree, vines, fig, olive, and pomegranate as "noble" ones. The reason for calling these five as "noble" must be their wide adaptation, ability to grow under relatively harsh environment, and their total food value. Later in the text, poplar has been called "lucky", probably because it has long life and requires little attention once it picks up growth.

The abrupt beginning of the text pointing out that cultivation is possible under both rainfed and irrigated conditions is interesting and noteworthy **(1)**. By the beginning of the 17th century, irrigated areas had increased and besides traditional methods of irrigation from tanks, wells, and rivers, canal irrigation was made possible **(120, 238)**. One can notice sporadically the evidence of increased knowledge base compared to earlier centuries. In the 16th century, Babur (1526–1530), the founder of Mughal dynasty in India, recorded in his memoirs (Beveridge, 1922): "People say that the date-palm amongst vegetables resembles an animal in two respects; one is that, as if an animal's head be cut off, its life is taken, so it is with the date palm, if its head is cut off, it dries off; the other is that, as the offspring of animals is not produced without the male, so too with date palm, it gives no good fruit unless branch of the male-tree be brought in touch with the female tree. The truth of this last matter is not known (to me)." While Babur was uncertain about the dioecious nature of date palm trees, by 17th century, Dara Shikoh was certain and therefore stated it as a fact **(44, 48)**. Information in some paragraphs appears confusing especially with regard to seasons. For example, barberry is "found in hot countries". In India, barberry grows only in cool, mountainous regions. The author probably was thinking of West Asia and the Mediterranean regions where barberry would grow in relatively "hot" regions **(184)**. Similarly it is stated that rice, except in India, was "grown in the beginning of the spring", again a fact in Mediterranean region **(234)**. It is stated that cotton grows best in "moderate climate" and is planted "in the same season" as paddy **(249, 250)**. Cabbage sowing time is indicated to be the same as cotton **(286)**. The author specifically mentioned "Rome and Europe" while discussing linseed **(251)**.

The author mentioned that spice crops such as black pepper, clove, nutmeg, cardamom, betel, and cinnamon **(218–222, 224)** were found in jungles as well as in gardens. Obviously large tracts of tropical forests existed in southern India then, which must have prompted the author to record presence of these crops in jungles.

There is an observation on sandalwood **(225)** that the trees are white and fragrant in hot countries, but these are black if grown on riverbanks and islands. We know that the sapwood of sandalwood is almost white and the heartwood is dark depending on age. I wonder if the author was confused and was given incorrect information.

Reference to lettuce **(257)** is made for its medicinal properties and not for use in salads. It is possible lettuce was not eaten as a constituent of salad in the 17th century. In the text the word "grass" is used in general sense and not only in relation to the gramineous plants. For example, coriander and chamomile are called grasses **(260, 269)**. Even today grass is used loosely to include non-gramineous plants such as hemp (*Cannabis sativa* L.).

Though the text deals mostly with growing crops in fields, occasional references to growing plants in pots was made **(266, 271)**.

It is stated that the lettuce is the seed of *khas* (vetiver); clearly it is a mistake **(263)**.

Seasons for planting and grafting

The text points out that the "best time" for planting trees or cultivation is when "the Sun is in the sign of Libra" (September 23 to October 23) **(2, 8)**. This is the beginning of the autumn season in the northern hemisphere. It is also stated that planting of trees can be done "from the end of the sign of Pisces" (February 19 to March 20); i.e., mid-March which is beginning of spring **(8)**. There is, however, a contradiction when it is stated that trees planted in autumn "do not grow long branches and roots" but trees planted in "spring season grow a large number of branches" **(9)**. There is reference to variation in planting time **(3)** and it is pointed out earlier, planting in proper season will give a good crop **(4)**. It is indicated that if plantings are done when there is "bright moonlight", trees will grow very tall but will produce less fruits, whereas if plantings are done during "the waning of the moon", the trees will not grow tall but will produce more fruits **(10)**. Similar view was recorded by the Roman writer, Columella (circa 60 AD) (Orlob, 1973). However, in Surapala's Vrikshayurveda (Sadhale, 1996), written seven centuries earlier (10th century AD), the view expressed is opposite. The first day (i.e., fullmoon day), the fifth, or the thirteenth day of the bright fortnight is good for sowing. I am inclined to believe that these were superstitions of the times.

For grafting, best time indicated is autumn **(24)**. However, opinion of some people to do grafting at the beginning of the hot season, when the heat is not excessive, is also stated **(25)**.

Suitability of soils

For many plant species, no specific mention about the kind of soil or soil preparation has been made. However, for some species, the description is given as follows:

Plant species	Description
Palm tree	Saline soil **(45)**
Vines	"Clean and pure" where vines have been grown before **(51)**
Fig	"Strong and humid but away from water" **(72)**
Olive	"Low-lying red soil" which is "not humid" **(83)**
Pomegranate	"Dry and gritty soil" **(95)**
Peach	"Wet soil"; "on the banks of canals or near them" **(120)**
Damson	Grows in "strong and fertile soil" **(127)**
Mulberry	Prepare "soil well"; mix sand **(132)**
Walnut	"Soil should be very fertile" **(156)**
Sissoo	"Grows in saline as well as in non-saline soils. In saline soils it will be white and in non-saline soils it will be black in color" **(197)**
Orange	"Wet and fertile soil, prepared properly with manure" **(203)**
Wheat	"Clayey soil, of black or yellow color" **(238)**; soil prepared well by several plowings by four pairs of bullocks **(240)**
Melon	Moist, clean, and saline soil; "if the soil is bad, a mixture of manure, sand, and sugarcane leaves will do" **(275, 280)**
Carrot	"If old soil is mixed in carrot's soil . . . carrots will become long" **(288)**

On the whole, the requirements of soil indicated in the text match with those that horticulturists accept today. For vines, "clean and pure" soil where vines have been grown before seems to be a recommendation to ensure that good, tested soil was used. Grapes in general suffer less from root diseases than foliar and fruit diseases and the previous successful grape cultivation might indicate that the natural microflora kept the potential pathogens suppressed. For similar reason, old carrot soil might have been recommended to obtain long carrots. Specific requirement of saline soil for melon probably is to indicate tolerance of melons to saline soils, especially when these soils have to be moist. The statement that sissoo (*Dalbergia sissoo* Roxb.) wood will be white in saline soils and black in non-saline soils does not make sense, unless the author had in mind another species, *D. latifolia* Roxb., which produces dark wood.

Land preparation

In general, the descriptions confirm what is normally done today for most of the crops covered in the text. For trees, pits were dug. For field crops, land was prepared appropriately, and pots were used for some species. The special treatment described for olives **(85)** deserves attention. The practice described must have been commonly followed in West Asia and the Mediterranean region where olives have been grown for millennia. It was recommended that the pits dug for planting olive trees should be kept open for one year for exposure to heat and air. However, if that was not possible, the soil in the pit was to be "burnt" for two months. Clearly this was done to protect young plants from soilborne pathogens and insects. Burning cow bones and dung in a pit prior to planting trees was also recommended by Surapala (Sadhale, 1996).

Weed management

Importance of weeds was well-recognized **(5, 6, 7)**. The time recommended for weeding was when the Sun was in Gemini (May

21 to June 20) or when the Moon was in Virgo. Weeds were to be uprooted to ensure eradication and then composted. The claim that the weeding knife should be made from copper to ensure eradication of weeds is interesting and puzzling. To expect that propagating parts of weed species would be destroyed upon contact with copper appears to be a tall claim. It seems that the belief about special weed-eradicating properties of copper has its origin in the agricultural literature of Arabs. Nuwairi, an Arab who lived in Egypt (1280–1332 AD), in his encyclopedia, recommended destruction of plants by striking these with an axe made of copper which had been immersed in goat's blood (Orlob, 1973). The weed management practices **(5, 6, 7)** described in the text seem to be based on the needs of West Asian/Mediterranean agriculture.

Special treatments before planting

The text mentions a few special treatments prior to sowing seeds or planting the cuttings. A few of these recommendations which need to be pondered have been given below:

i. ". . . to make peaches sweet take one seed each of quince and almond, remove their pith, place it in the pith of a peach and sow them. When the three seeds grow up in the form of one peach tree, the fruits of this peach tree will be very sweet" **(37)**.

ii. "If a rose is grown near a peach tree, the fruits of this peach tree will be sweet-smelling" **(38)**.

iii. "If at the time of planting a vine cutting, dung is applied on its lower part, it will produce roots quickly and will remain safe from insects" **(66)**.

iv. "If two or three eggs are bunged beneath each plant, it will produce more figs. Or, if the sap of the pounded leaves of olive is sprinkled on a fig tree it will grow more figs" **(78)**.

v. “The branches chosen for cultivation should be from the upper part of the tree (pomegranate) and not from the surrounding parts. And they should be broken by hand and not cut with a knife or blade” **(97)**.

vi. “If walnuts are soaked in old wine and urine of children and are sown, the husk of the fruits produced by these will be soft and tender” **(157)**.

vii. “If a walnut is carefully broken and its whole kernel is taken out intact, and that kernel is wrapped in wool, a woolen cloth, or the leaves of vine and is sown, the walnut produced by that tree will also have very thin husk” **(158)**.

viii. “If a big pistachio-nut is slit, its kernel is taken out and wrapped in a little wool or a woolen cloth (*pashmina*) and sown in such a way that its head is kept upwards, its tree will produce pistachios with bigger kernels and which have very thin skin” **(165)**.

With the present knowledge base, it is difficult to scientifically explain the basis of recommendations (items i, ii, vi). However, it would be prudent to try some of these recommendations before dismissing them as nonsense. Item iii above can be explained; dung will supply some nutrients and protect the cut end from rotting. Item iv: bunging eggs in root zone might quickly provide iron, sulfur, phosphorus, and possibly other ingredients to stimulate more flowering and fruiting. Olive leaves are known to possess antiseptic properties and therefore, sprinkling olive leaf juice might help fig trees to increase fruiting. Item v: if branches are broken by hand instead of cutting by knife, the shredding of the broken end might ensure increased rooting. Items vii and viii: kernels of walnut and pistachio are damaged by birds and rats; wrapping kernels with wool should protect them from such a damage. However, it is difficult to accept that such a treatment would lead to production of thin ‘husk’ or ‘skin’ in fruits on these trees.

Special planting methods

One of the most interesting sections of the text is "transplanting big trees" **(11–15)**. Such a procedure has not been described in any other available ancient or medieval texts of India. The recommendations made indicate considerable experience in successfully transplanting large trees. The idea of keeping "two water-filled pitchers with small holes at the bottom" to provide water-drip to the root system is most interesting and practical even today for orchardists having limited resources. I was happy to read recently an article by Mahajan et al. (2000) on pot-drip procedure wherein the authors have given data to prove superiority of this method over direct watering around newly-planted mango saplings in areas where chronic water shortage exists. Here is an example of how a centuries-old simple irrigation technique is relevant today. Incidentally, the text mentions similar drip arrangement to keep the new peach graft moist **(35)**.

Another interesting and practical method is described under vines **(56)**. Where water is scarce but the soil is good for grapes, it is recommended that the pits be dug so deep that moist soil becomes visible, and then 20–30 cuttings of a "good variety" are planted. I understand this practice is still followed in some areas.

Distinguishing varieties of plant species

Farmers have been distinguishing varieties (cultivars) of crops for more than 2000 years. We find mention of varieties in some of the crop species; e.g., palm tree **(45)**, grapes **(56)**, willow **(195, 196)**, citron **(199)**, wheat **(241)**, millet **(246)**, melon **(276)**, pumpkin **(283)**, and brinjal (eggplant) **(285)**.

Many wheat varieties existed, one of which was called Sharbati. The name of this variety is missing in the 19th century document by Watt (1889). However, one does find this name in the Wealth of India (CSIR, 1976) written in the 20th century. The name refers to an amber-colored wheat. The word Sharbati was used for the cultivar Sharbati Sonora evolved after the import of dwarf wheats from Mexico in recent years.

Manures and manuring

In general, importance of application of manure has been communicated well in the text, although reference to manures and manuring is made in respect of only a few species, such as palm tree **(45, 46)**, vines **(52, 68)**, fig **(78)**, olive **(90)**, pomegranate **(99, 102)**, guava [pear (?) (*Pyrus communis* L.); **114**], peach **(126)**, almond **(148, 153)**, pistachio **(164)**, and carrot **(289)**.

Manures mentioned are dung, salt, and nitre for soil application in case of palm trees **(45, 46)**, nitre and vine sap as foliar application in vines **(68)**, eggs in soil and olive leaf-sap sprinkling on leaves in fig **(78)**, dung in soil in olive **(90)**, pig's dung and human urine in soil in pomegranate **(102)**, night soil, animal dung, and sheep's blood in soil in guava [pear (?); **114**], dry dung of pig in almonds **(153)**, and cowdung in carrots **(289)**. It is stated that almond and pistachio do not need much manure, but application of pig's dung will give "sweet" almonds. All the materials mentioned above are organic in nature except nitre, which is potassium nitrate and was commonly used for making gunpowder. Maro (70–19 BC), a Roman naturalist had recommended use of nitre for seed treatment (Nene, 1999). Nitre as a fertilizer was new to the Indian agriculture as no document before the present one mentioned use of nitre as a manure. This must be therefore one of the first inorganic fertilizers used in India. The recommendation to sprinkle nitre on vines must have been based on observing beneficial effects on growth of vines.

Salt has been mentioned as "fertilizer" for the palm tree **(45, 46)**. Modern texts (Manohar and Chandra, 1995) mention that palm trees can "tolerate more alkali or salts" and "salts" include sodium chloride. It is recommended that the pits dug for planting "should be treated with chlorpyriphos or endosulfan for the control of termites. The pits should also be treated with 4 percent formalin solution and covered with polythene sheet for three to four days before refilling with planting mixture. A mixture of 4 to 6 baskets of well-rotten farm yard manure, top fertile soil, 50 g captan and 50–100 g insecticidal dust is used for refilling the pits. The pits are watered . . ." Where are the salts in this? Today we claim that the palm tree is "tolerant" to salts. However, has it been scientifically proven that salts are not "needed" by the tree? Could the salt do some of the tasks that we expect today the insecticides and fungicides to do? We know very well that coconut palm trees, which are grown away from coastal areas, are given small quantities of common salt almost every year.

Eggs **(78)**, because these would decompose quickly, should provide micronutrients, especially iron in a very short time to the plants.

A statement under *baqla* (*Vicia faba* L.) is noteworthy **(245)**. It is mentioned that roots, branches, and leaves of *baqla* "have the qualities of manure and it increases the strength of the manure" and that is why it is grown as an intercrop. This is a very significant statement pointing to the beneficial effects of legumes, which we know so well today.

Conservation of moisture

Even today, the usual method of utilizing the soil moisture better is to make a basin around a tree so that rain water or applied water moves towards the tree trunk, and thus to the root system. This system is mentioned under olives **(86)**. An interesting method is described under vines **(54)**. To conserve moisture, pits with "broad bottoms and narrow necks" are dug and then cuttings are planted. To further conserve moisture, stones or clods are kept at the top of the pits.

Plant protection

Recommendations to protect plant species from insects, fruit-drop, fruit cracking, heat, and cold have been mentioned. These are:

i. To protect walnut kernels from insects after sowing, wrapping in woolen cloth or in poplar leaves is recommended **(21)**. Kernels thus treated will be protected from rats and bird damage as well.

ii. To control insects of vines, application of dung to lower part of cuttings has been suggested **(66)**. Additional recommendations to protect vines from insects are:

   - prepare a mixture of lentils, gram (chickpea), vetch, faba bean, other beans, and dry grass and place it in pits made for planting the cuttings **(67)**;
   - grow creepers such as cucumber, beans, and pumpkin around the cuttings **(67)**;
   - sprinkle pine oil on lower parts of cuttings **(67)**; or
   - application of melted fat on cutting knife, application of a mixture of garlic paste and oil to roots, or application of a mixture of dry leaf dust, sap from pruned branches, and wine stored in an earthen pot **(70)**.

Use of dung, garlic, and pine oil should protect the cuttings from damage by some insects and pathogens. Burning of garlic was recommended for "expelling caterpillars" by the Roman author Palladius (4th/5th century AD) (Orlob, 1973). Practice of using cowdung continues even today. Growing creepers in the vicinity could provide vegetation for predators and parasites of insects that attack vine. This recommendation as well as the one in which placing mixture of legume seeds and dry grass in pits and application of dry leaf dust mixed in wine need to be experimentally verified.

iii. In case of figs, application of resin is recommended for controlling insects attacking the newly transplanted young saplings **(73)**. If cuttings of figs are to be planted, these are soaked in salt water (concentration not mentioned) for 3 days and also smeared with cowdung **(74)**. For the fruit-drop disorder in figs, application of "a little salt and mulberry vinegar" after exposing roots is recommended.

Biocidal properties of salt and vinegar are known. Application of resin is an interesting recommendation. Resin was recommended by Palladius, a Roman writer of 4th or 5th century AD, for "curing sick quinces". Palladius' work (De Re Rustica) was available to medieval writers (Orlob, 1973). It is therefore possible that resin remained on the farmers' list of insecticides throughout the medieval period. Natural resins from trees have been available in India for centuries. Resins are complex chemically and often contain cinnamic and benzoic acids as well as tannins. The latter are known to have biocidal properties. Tannins from *Shorea robusta* Gaertn. are known to possess anti-termite properties. Good resins are also produced from *Calophyllum inophyllum* L., *Tectona grandis* L., and several other trees.

iv. To control fruit fall in olives, a "type of grass known as *aqtaha*" is to be placed at the top **(92)**. Despite my best efforts, I have failed to identify the plant. In any case it is difficult to explain the treatment except that the "grass" cover could cut off excessive radiation.

v. Resin application to roots has been recommended for preventing cracking of pomegranate as well as for preventing damage by insects **(103)**. Reference to cracking of pomegranates is found in ancient literature (Orlob, 1973) but at no time resin application was recommended.

To prevent damage of fruits by birds, roots of pomegranate should be covered with pumpkin roots and leaves during winter **(104)**. It is difficult to rationalize the recommendation unless verified scientifically.

vi. For controlling insects attacking apples, sprinkling of resin on soil is recommended at the time of planting **(107)**. Strangely a mixture of sheep droppings, pig's dung, and human urine is put around roots, again to keep apple trees free from insects **(108)**. To save apple plants "from all calamities", weekly application of donkey's dung suspended in water has been recommended **(109)**. Application of excreta of sheep, pig, and donkey, and human urine can at best keep the apple tree well-nourished, which in turn perhaps keeps insect and disease damage minimal.

vii. In case of mulberry, placing wild onions (*Urginea* sp.; syn. *Scilla* sp.) in the root zone of the transplanted sapling is recommended as "useful" **(136)**. Onions and garlic are known to possess biocidal properties. Wild onion (*Urginea indica* Roxb.; *kunth*) is poisonous to rats.

viii. A practice that is still followed to protect melons from excessive heat or cold has been mentioned **(281)**. Covering melon fruits with earthen pots is a practice that small farmers can follow today.

In all the references to plant protection in the text no specific mention of any disease has been made. Perhaps the word "insect" has been used to include all disorders that cannot be attributed to adverse environment. In contrast Indian authors such as Surapala (Sadhale, 1996) had clearly identified "internal" and "external" disorders several centuries before the present text was written.

Some interesting recommendations

Pomegranate. Recommendations to produce seedless fruits **(19)**, prevent cracking of fruits **(20)**, and obtain red fruits **(101)** are given.

For producing seedless fruits, remove pith from a branch after giving a long, vertical cut, "remix" that pith, tie it back using a wooden splinter, and cover the cut with soil. It is difficult to rationalize this recommendation.

To prevent cracking of fruits, "three pebbles" are spread around the trunk, or a sea-onion or squill (*Urginea* sp.) is placed under the roots. It is possible to trace the origin of this recommendation to authors of ancient period. Columella (60 AD), a Roman writer on farming, recommended placing "three stones close to the roots of the freshly planted tree" to prevent cracking of pomegranate fruits (Orlob, 1973). Obviously the recommendation survived through medieval period. Use of squill was mentioned by Ibn al-Awam, a Spanish-Muslim agriculturist, who lived in Seville (southwestern Spain) at the end of the 12th century. He stated: "When a pomegranate tree is planted, a seedling of *Scilla* should be planted alongside it. This prevents the fruits from splitting, and they will have a lovely finish." Ibn al-Awam also mentioned placing stones in soil (Orlob, 1973). It should be noted that the exact cause of fruit cracking is not known even today. The recommendation to obtain red pomegranates is similar to the one suggested for getting seedless pomegranates.

Grape. To produce multicolored bunches of grapes, the recommendation was to put cuttings, obtained from varieties that produce grapes of different colors, together into a cow's shinbone or "tie them tightly with a cord", and plant these in a specially-made pit **(62)**. Is it possible that due to lack of space, there is lateral fusion of the tissues of cuttings, and the cuttings actually become one grape plant? One has to try to confirm such a possibility.

Fig. The technique to produce multicolored figs **(76)** is similar to the one described under grapes above. The technique needs to be scientifically verified. To hasten ripening of figs, it was suggested that bird excreta mixed with powdered black pepper be applied on raw figs **(81)**. It is possible to argue that such a treatment would enable the raw figs to absorb nutrients from bird excreta and black pepper may produce microwounds and stimulate production of phenolic compounds. Again the treatment needs to be verified.

Olive. Two recommendations are interesting:

i. To produce more fruits, making a hole in the lower part of the trunk and passing through it two branches of a fruit-bearing tree, and sealing the hole with clay **(88)**.

ii. To ensure faster growth, keeping some grass at the bottom of olive cuttings while planting **(89)**.

We can trace the origin of the first recommendation to the Roman writer Palladius (4th/5th century AD) (Orlob, 1973), who made it to turn barren trees into fruiting trees. The decomposing grass could stimulate rooting.

Apple. Sediments of old wine were to be placed around roots to obtain "red" apples **(110)**. Wine is known to provide iron. Is that the reason? Or is it that wine "irritates" the roots, stimulating plants to produce more phenolic compounds?

Peach. A prescription **(124)** to produce seedless peaches includes planting a willow tree adjacent to peach tree, making a hole in the trunk of willow tree, inserting a branch of peach tree, and then tying and sealing them. When the union is successful, the lower end of peach tree is cut. Thus the peach branch then grows into a peach tree that remains attached to the willow tree. Again we see the origin of this prescription in Palladius' writings, but for a different reason. Palladius (4th/5th century AD) states, "If the fruits show signs of rot, a hole should be bored in the trunk and a willow twig inserted into it" (Orlob, 1973). Ibn al-Awam (12th century AD) also mentions insertion of a willow twig in the area of peach tree from where pith is removed to make peach trees fruitful (Orlob, 1973). Thus one prescription; i.e., bringing peach and willow trees in some kind of union, was claimed to achieve different objectives. There is a need to study the association of peach and willow trees.

Walnut. A recommendation to hasten growth of walnut tree which would produce bunches of fruits **(163)** is similar to the one mentioned for obtaining multicolored grapes and figs **(62, 76)**. However, the details are somewhat different. Interestingly, we find a similar technique described in Surapala's Vrikshayurveda (Sadhale, 1996); for lotus (verse 265), and *Nerium* sp. and pomegranate (verse 266).

Rice. The recommendation that cold water should be avoided for irrigation is interesting **(237)**. This makes sense because rice is a warm season crop. However, in subtropical areas, where irrigation is given during the panicle emergence stage (approaching autumn), the water might be cold and its adverse effects must have been noted. In India we do not normally think about the low temperature of irrigation water, possibly because the water almost always carries soil. Also, it is a common practice in some areas to mix manure in water.

Relationships between plant species. There are some interesting statements about relationships between plant species when grown together. It is stated that sweet basil, when grown near plants of brinjal (eggplant), becomes "stronger and better" **(265)**. It is recommended that garlic be grown in between rows of other crops because growing garlic makes soil "vigorous" **(293)**. This beneficial effect of garlic could be due to biocidal properties of garlic. The author states that pomegranate and guava (pear ?) trees are "very friendly with each other" and therefore both "yield more fruits" **(302)**. Similar beneficial effect has been claimed for pistachio and almond trees **(303)**. Once again we find reference to beneficial plant relationship in ancient literature. For example, Theophrastus (372–285 BC) mentions: "The olive and myrtle are sympathetic to each other; the olive protects the myrtle against winds" (Orlob, 1973). This area of research is an interesting one. I came across some papers revealing beneficial relationships between crops in recent literature. Examples are: spring maize and ginger (*Zingiber officinale* Rosc.) intercropping from China (Yao *et al.,* 1997), wheat and sunflower (*Helianthus annuus* L.) intercropping from China (Du *et al.,* 1992), and wheat and garlic intercropping from Pakistan (Ahmed and Saeed, 1998).

Preservation

Some techniques to preserve fruits and flowers are given. For example:

i. Place quince in a man-waist deep pit near the tree, cover them with its leaves and sand, and level the surface. Keep the pit moist at the top **(39)**. It was claimed that the fruits can thus be preserved for one year. A similar procedure was suggested for apple fruits **(40)** and for grape cuttings **(58)**.

ii. Place mature bud of a blue-flower lily in a pot (earthen ?), seal the pot-mouth with clay, and bury the pot in soil for a year. The bud would remain fresh and will blossom if placed under the sun **(42)**.

iii. Keep a red rose bud in a hollow reed and bury in the ground for some time. It will be preserved and then blossom when taken out of the reed and hot water is poured on it **(43)**.

All these methods make sense and should be adopted at least in some regions.

Destruction of plants

It is puzzling to note that the author has prescribed methods to destroy trees **(16, 17, 18)**. Methods included branding roots several times with red-hot iron **(17)**, placing ashes of sheep horns around exposed roots **(18)**, and a strange method of filling lentils (cooked ?) in mouth at breakfast time, chewing them, and simultaneously biting the tree branches **(16)**. The rationale of the first two methods can be understood, but not of the third one. Methods to destroy certain plants such as *Terminalia arjuna*

(Roxb.) Wight & Arn., coconut, cotton tree, plantain, ash gourd (*Benincasa hispida* (Thunb.) Cogn.), and cucumber (verses 273, 274, and 275) and to induce fruit and flower drop (verse 276) are given in Surapala's Vrikshayurveda (Sadhale, 1996). Orlob (1973) argues that such methods of destroying trees and vegetables must have been used by "warring parties" in ancient and medieval periods. In the Indian context, it is possible that such methods were needed to clear areas for inhabitation; however, the choice of plants mentioned by Surapala does not fully explain the possibility.

Some ambiguities about the identification of plant species

Guava. Guava is native to South America and from accounts available, it was introduced into India by the Portuguese. In both Persian and Arabic, pear is called *amrud*, but in North India, *amrud* means guava. If we accept "*amrud*" given in the text as guava, then the text will not have any reference to pear, which would be very unusual considering the fact that major trees of subtropical and temperate West Asia and the Mediterranean region are mentioned in the text. In my opinion, the author is actually referring to pear, and not guava in paragraphs **112** to **115**.

Gram. The description of gram (chickpea) in paragraph **243** is confusing. In West Asia and the Mediterranean region, gram is grown in spring and rains occur during that season. However, gram is known to perform well on residual moisture, and therefore the author's remark that "it needs plenty of water, especially if the soil is sandy" is confusing.

Millet. The description is vague **(246)** and does not help in identifying exactly which millet the author is referring to.

***Khas* (vetiver).** The statement that "Lettuce is actually its seed" is obviously a mistake **(263)**.

Concluding remarks

The text "Nuskha Dar Fanni-Falahat" is a document not as old as some others such as Krishi-Parashara and Surapala's Vrikshayurveda, but captures the knowledge base in some aspects of agriculture as practiced in medieval period primarily in West Asia and the Mediterranean. Since it was written in India during the Mughal rule, we notice very brief references to crops grown in the Indian subcontinent, although Babur, Akbar, and Jahangir had earlier described many economic plants of India. The author of the present text has attempted to compile a compendium on crop production; we seem to have only an abridged version available to us.

The contents of "Nuskha Dar Fanni-Falahat" are almost totally different from the earlier, indigenously written texts. It is not difficult to understand the reason. Historically speaking, the conquerors almost always despise the conquered. The Portuguese and the British did it and so did the Mughals. British tried to implant their knowledge and culture in India as something superior compared to what was indigenous. Mughals did the same. Because Dara Shikoh was a scholar with an open mind, he tried to encourage exchange of information between the cultures of West Asia and the Indian subcontinent. The text "Nuskha Dar Fanni-Falahat" seems to be one such effort. During the Mughal rule in India from 1526 through 1857, a large number of persons from West Asia and West Central Asia (e.g., Uzbekistan) settled down in India, owned land, and practiced agriculture, especially horticulture. Thus in villages, at the level of farmers, exchange of knowledge was occurring during the 300-year period. From the sporadic references we find, the Muslims seem to have specialized in ornamental gardening and in developing excellent fruit orchards.

In Nuskha Dar Fanni-Falahat, one can note many ideas for research. What is needed is a sincere desire on the part of modern-day scientists to study the old techniques, remembering all the time that our ancestors were not fools.

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Appendix 1

Supplementary list of plants mentioned in the English translation of the Persian manuscript.

English name	Botanical name
Oak	*Quercus* sp. (?)
King oak	*Quercus* sp. (?)
Kandas[1]	*Sagertia* sp. (?)
Sapaidar[1] (white poplar)	*Populus alba* L.
Gulnar[1] (pomegranate)	*Punica granatum* L.
Hyacinth	*Hyacinth orientalis* L.
Aloes-wood[2]	*Aquilaria malaccensis* Lam. (syn. *A. agallocha* Roxb.)
Beans, *baqla*[1], *raaj-maan*[1] (faba bean)	*Vicia faba* L.
Vetch (?), *mash*[1] (black gram ?)	*Vigna mungo* (L.) Hepper
Dill, *soya*[1]	*Anethum graveolens* L., *A. sowa* Kurz
Rue, *sudab*[1]	*Ruta graveolens* L.
Chamomile	*Anthemis nobilis* L., *Matricaria chamomilla* L. (?)
Sea-onion, squill	*Urginea maritima* (L.) Baker
Lily	*Lilium* sp. (?)
Aqtaha[1] (grass)	
Wild onion	*Urginea* sp. (syn. *Scilla* sp.)
Aroor[1] (berry)	
Jasmine	*Jasminum* sp.
American jessamine (yellow jessamine)	*Gelsemium sempervirens* (L.) Ait. f.
Henna	*Lawsonia inermis* L.
Corn (maize)	*Zea mays* L.
Mustard	*Brassica* sp.
Anise	*Pimpinella anisum* L.
Poppy (opium poppy)	*Papaver somniferum* L.
Fenugreek	*Trigonella foenum-graecum* L.
Spinach	*Spinacia oleracea* L.
Turnip	*Brassica rapa* L.
Radish	*Raphanus sativus* L.
Bamboo	*Bambusa* sp.

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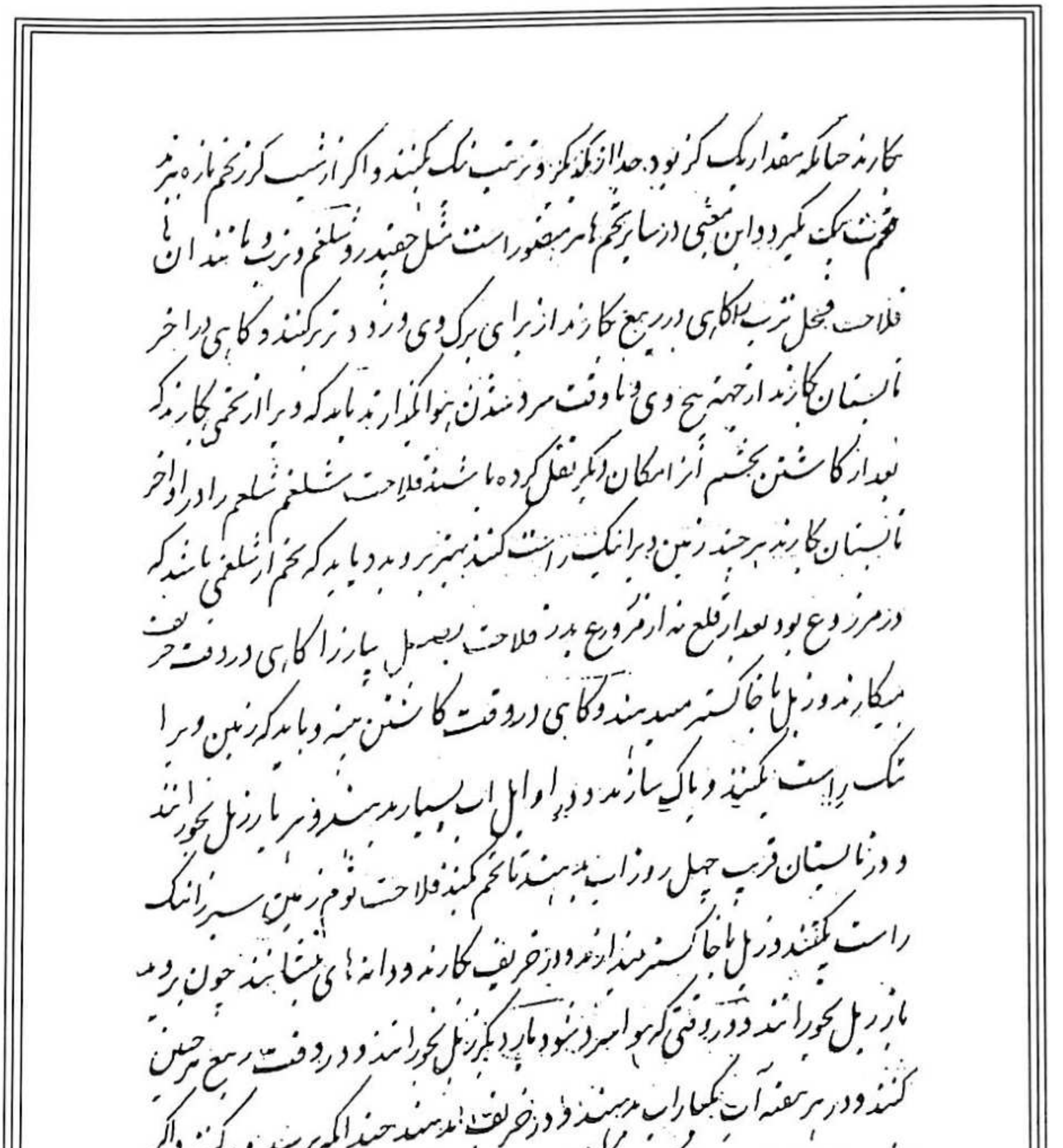
[1] Persian names.

[2] "Aloes wood" is fungus-infected, fragrant wood.

سازند یکشبانروز بعد از ان بکارند دانه های ان بزرگ شود و اگر قدری با تخم خوز زراعت
کنند زود تر برسد و تربچه را سه شبانه روز در آب اغشته کنند و بعد از ان بکارند تا
تلخی ان کمتر شود و بعضی از اهل فلاحت گفته اند اگر تخمی که در دشت حاصل باشند در کوه
ها بکارند و انچه در کوه ها حاصل شده باشد در دشت بکارند بیشتر حاصل شود و
نیکوتر اید و بعضی گفته اند که اگر از پوست گرگ غربالی سازند که از انها سوراخ بود
بمقداری که انگشت در ان برود تخم از ان غربال افشانند ربع ان بیشتر اید
[illegible] و در دفع [illegible] زراعت اگر ضفدعی که در ان اب بود او را زنده گرفته در ظرفی
نهند و ان ظرف را در وسط زمین مزروع دفن کنند یکساعت بگذارند و بعد از ان بیرون
ارند از افتها محفوظ ماند و ربع ان نیکو بود و اگر عدس را با هر تخمی مخلوط بکارند از افتی که
بعدس رسد و زراعت دیگر سالم ماند فایده گفته اند که درخت انار و درخت مورد
با هم محبت دارند چون این دو درخت نزدیک یکدیگر نشانند بار بسیار اورند و درخت انار
که ضعیف بود در زمستان سرما دران تاثیر کند اگر ابرک کدو و ساقهای درخت کدو بپوشند
از سرما محفوظ ماند همه نهال را چنین نگاه میتوان داشت و گفته اند که پسته و بادام
دوستان یکدیگر اند چون انها را نزدیک یکدیگر نشانند بار بیشتر اورند تم تم

تمام شد کتاب فلاحت بتاریخ پنجم شهر ذیقعده سنه ۱۲۰
هجری منقول از کتاب گنج باد آورد که بالمقصد دارا شکوه بود
در دار العلوم ططه و غیره لاحق [illegible]



بکارند چنانکه مقدار یک گز بود جدا از یکدیگر و ترب تنک بکنند و اگر از ترب گزر تخم پاره بر
تخم ترب تنک بگیرد و این معنی در سایر تخمها مشهور است مثل چغندر و شلغم و ترب و مانند آنها
فلاحت فصل ترب گاهی در ربیع کارند از برای برگ وی و زرد و تر کنند و گاهی در اواخر
تابستان کارند از جهت بیخ وی و تا وقت سرد شدن هوا گذارند باید که در از تخمی کارند که
بعد از کاشتن بخشم از امکان دیگر نقل کرده باشند فلاحت شلغم شلغم را در اواخر
تابستان کارند هر چند زمین در آن تنک راست کنند بهتر رود باید که تخم از شلغمی باشد که
در مزروع بود بعد از قلع نه از مزروع بذر فلاحت زنجبیل پیاز را گاهی در وقت حرث
میکارند و زبل با خاکستر میدهند و گاهی در وقت کاشتن پنبه و باید که زمین وی را
تنک راست بکنند و پاک سازند و در اوایل آب بسیار میدهند و هر بار زبل بخورانند
و در تابستان قریب چهل روز آب میدهند تا تخم بکنند فلاحت ثوم زمین سیر را تنک
راست بکنند و زبل با خاکستر بدهند و در خریف کارند و دانه های متباین چون بروید
باز زبل بخورانند و در وقتی که هوا سرد شود بار دیگر زبل بخورانند و در وقت ربیع سرچین
کنند و در هر هفته آب بگذار آب میدهند و در خریف آب میدهند چندانکه برسند و بر کنند و اگر
تخم وی را نیز کارند بروید ولیکن بزرگ نمی شود و در هر زمین که سیر کارند قوت آن زیاده
شود از این سبب او را در میان نهالها بکارند فلاحت کرایش وقت کاشتن گندنا
در خریف بود پیش از سرد شدن هوا و در ربیع پیش از کاشتن پنبه بود باید که زمین وی را
تنک راست بکنند و بان زبل با خاکستر آمیخته بدهند و هر بار که ببرند زمین را نرم بسازند
و زبل با خاکستر بخورانند و آب میدهند و هر چند که از شب تر ببرند رود و تر رویده و قوت
زیاده تر گردد فلاحت زنجبیل ابتدا از عروق کارند مانند زرنباد و زرد چوبه

و بهترین وی آن بزر ابیض گویند و طعم آن شیرین بود باید که گشاده بکارند و هر بار
که آب دهند زمین را نرم سازند و زبل و خاکستر آمیخته در میان برگهای آن بیندازند
تا تخم نکند و زود نشود و علفهای زیادتی را پاک بکنند و چنان کنند که برگهای
وی چرب و براق نماید و هر چند که آب شیرین تر و سرد تر بود لطیف تر گردد
مانند خیار فلاحت کرنب کلم را در موسم کاشتن پنبه کارند و زمینش نیک راست
کنند و نرم سازند و زبل بسیار بیندازند فلاحت شلغم موسم زراعت چغندر نیز
موسم کرنب بود باید که زمین در آن نیک راست کنند و عمیق سازند و زبل بسیار بخورانند
تا بیخ و برگ وی قوت بگیرد و گاهی تخم وی را در جای مختصر کارند و بعد از آنکه بیخ
و ورق وی بزرگ و غلیظ شود و برگ وی را ببرند و بعضی را بر کنند و در جای دیگر
بنشانند و اگر خواهند که بیخ آن بسیار بزرگ شود مغاک بزرگ کنند و در وی
خاک و سرگین و کاه آمیخته بیندازند و در وی بکارند و چون برود شاخهای آنهم
یکی شود و بعضی به بعضی متصل گردد و در دفنی که سر مغاک پر شود بعضی را ببرند و
خرج کنند و بعضی را برای تخم بگذارند و همچنین در کرنب و گندنا و شلغم و ترب
مانند آنها نیز بکنند بی تفاوت فلاحت جزر باید که زمین را دو کرت نیک
راست بکنند و پاک بسازند و در وی خاک کهنه بیندازند و در هر روز یکبار آب
آب دهند و گویند آن بر زمین غالب میشود خاصه که دراز باشد و وقت زمین
را حذب کنند ذیب یک گز و از این جهت بدتی بمانند پس میباید که او را نیک
بکنند و یکسال بگذارند و آفتاب بخورد و قابل زراعت شود و تخم وی را از
گزری بگیرند که از برای تخم کاشته باشند تا قوی شود و او را در دور در د بکارند

تخم خربوزه تمام را دران کارند اول خاک را بسر بیل بردارند و از ان تخم چند تا دران اندازند
واندک خاک خشک بر زبر ان بکنند بعد از ان که بروید سه چهار برگ شود دیگر دی خاک
نرم بر برند و در جای که رسته چهار تا رسته باشند یکی بگذارند و باقی همه را دور بکنند و اگر از
زمین بد باشد باید که زبل را با ریگ و ورق الطرا سحقه به بیخ ان برسانند و اگر فرصت
ان نباشد زبل با آب آمیخته بدهند و در مواضع که سرما سخت باشد تا که با سخت او را احتیاط
کنند و مانند کاسه از سفال یا از سرگین سازند و بر بالای او نهند فلاحت خیار و اکثر
احکام خیار مثل احکام خربوزه بود و باید که در هر دو سال در جای دیگر کارند و وقت
کاشتن وی اول بهار بود و از سرما سخت دیگر با سخت تنگ نگاه دارند تا خوب بروید
و بار آورد فلاحت ترنج و وقت کاشتن کدو نیز وقت خربوزه بود و او را اگر
نزدیک دیوار خانها و گرد بستانها کارند و ان مختلف می‌بود و باختلاف اماکن
در هر جا بطوری و شکلی می‌باشند فلاحت بادنجان او را در اوایل سال کارند در زمین
دی باشند زمین خربوزه بود دیگاهی او را در زمین مختصر زبل داده کارند و آب دهند
چندانکه بروید و بلند شود بعد از ان از آنجا بجای دیگر منتقل کنند برند و بترتیب نشانند
و آب و زبل میدارند تا قوت بگیرد و میوه دهد و ان بر انواع است مدور و مستطیل
سفید و بنفش و سبز و تلخ و سرد امزار و رقیق و غلیظ این است انچه از کتاب
شجره نهال بر داشته شده فلاحت و زراعت کردن بعض چیزها چون تخم یاسمن و عدس
را بسرگین کاو آلوده سازند و پس زراعت کنند زود تر سبز شود و بیشتر
برسد و باقلا را یک شبانه روز در آب اغشته و بعد از ان کارند دانه‌های ان بزرگ
شود و باید که در وقتی کارند که ماه در محاق باشد و اگر نخود را در آب گرم اغشته سازند

و آن آب زیاده بدهند چون سرد شود و آن گل کنند و برگها بدر آورد در زیر و زبر گل
و زیر آن کنند و زعفران بذر را اوند تا وقتی که یخ بندی شود و بعد از آن زمین را بکنند و زبل
بخورانند تا نو روی بیشتر شود و نباید که آب بدهند تا اواسط خریف که هنگام رستن
اوست و عروق آن تا مدت سه چهار سال در زمین میماند و بچه های بسیار بدر می
آورد و هر سه که زمین تنگ شود از آن جهت بر کنند و در جای دیگر بنشانند تا در همانجا
بکارند اگر زمین دیگر نباشد فلاحت سنبل سنبل هندی بنشانند و برگ وصلی بدهند و برا
سنبل الطیب گویند فلاحت بطیخ که زمین خربوزه تنک و مرغزار و درختان نباشد
تا علف عرب در روی نروید و بخارات ضایع نشود و آن در زمین سبخ و شوره
شیرین تر شود و لطیف تر پس باید که زمین تنک را اختیار کنند و آن خوب کراب
بکنند و نرم سازند و اگر زبل حاجت باشد بیندازند و اگر خاک کهن و عفن باشد نیز
بود خاصه خاک کهنه دیوارها و در تخم وی نیز احتیاط کنند و هر جنس را علیحده علیحده
جدا کنند و هر چه زود تر برسد اول بکارند مثل صفی و جریقی و دستوی و گویند
هر چه تخم وی بیشتر باشد زودتر برسد از آن که تخم آنکه کمتر باشد و گاهی
خربوزه را بیخ خار بر کشتن بکارند بغایت خوب شود و او را از بیخ ببرند و سر در را بشکافند
و تخم خربوزه در آن نهند و بخاک نرم بپوشند و باب حاجت نباشد و در بعضی جاها همه
زمستان در زمینهای نشیب و مغاک آب می اندازند تا همه اجزاء آن سیراب شود بعد از آن
هر چه آب وی کمتر شود فرو نشیند در وی تخم بکارند تا وقتی که آب آخر شود و از تخم
فارغ شوند و درین طریق حاجت آب و زبل نباشد و گاهی در بهار و نیز آب را در مرها
و مغاکها می اندازند چند آنکه پر شود بعد از آنکه آب فرو نشیند زمین را تنک را سست بکنند و

فلاحت ریحان وقت کاشتن تا سفرم وقت نیمه بود باید که اول زمین را نیک راست
کنند و آب بدهند و نرم بسازند و بکارند و زبل تا جا که سخته میدارند و برگ بعض
پهن میباشد و بعض باریک و آنچه برگ وی خردتر بود بویش خوشتر و لطیف تر بود
از دیگر و انواع ریحان بغدادی گویند و آنچه در حوالی بادنجان بکارند در غایت خوب شود
فلاحت حسن کش را در گرمسیرها در خریف بکارند که زود بروید و در زمستان گل
کند و در سردسیرها در وقت آفتاب بحوت بنشانند و اگر در ظرفها بکارند در زمستان
بزر وابو د وقتی که هوا سرد باشد بخانه بیاورند و اگر آفتاب برآید بیرون برند و در
وقتی که گل کند و باران سخت بود اصول او را بکنند و نزدیک بند در بهار ببرند تا خشک
شود و شاخ میانه حرکت نکند و مجوف و ضعیف قوة نگردد بلکه بر حال خود بماند
صلب و محکم در سالی که بنشانند گل بیاورد نه در سال دوم و آن بچه بسیار میکند
و آن را برکنند و از جایی بنشانند تا زیاده شود خاصه اگر زمین و برا نیک راست
نکنند و زبل بسیار ریزند از مرو رفاه آن بزرگ شود و بویش مضاعف گردد فلاحت خطمی
خطمی خطمی را در ربیع بکارند تا آخر تابستان نگذارند و از بیخ و تخم وی برده برد و خطمی
زمین بگیرد اقحوان وقت کاشتن بابونه گاو نیز وقت خطمی بود فلاحت
مرزنجوش این در گرمسیرها بیشتر میباشد در فصل خریف بکارند و در سردسیرها
در فصل ربیع در باغها در ظرف فلاحت زعفران زمین را در تابستان بکارند اول
زمین را نیک راست کنند و در آن شیارها کنند مقدار یک گز سر نیز در عرض و صغار
که برابر فندق باشد در آنها بکارند و هفته چهار در آب بدهند و چون فصل خریف
در آید بماند و از آن رستن وی برسد و تا آب میدهند در هر ده روز یکبار آن

کنجد نیز باشد اوقات کاشتن با تقدم بود مثل شبدر انجیر فلاحت نیل وقت بکاشتن
نیل وقت کاشتن پنبه بود و کاشتن آن آسان بود در رسیدنش زود تر فلاحت [illegible]
وقت زراعت آن فصل خریف میباشد باید که در هر هفته یکبار آب بدهند و وقت خریف
بر آورند و هر زمین شوره که هیچ صالح نشود کاشتن وی نیک شود باشد و قوی خوب
تر و بهتر بر دهد فلاحت کزبره گشنیز را در همه وقت میتوان کاشتن خاصه در خریف و بهار چنید
زمین وی نیک باشد و قوی خوب تر و بهتر بر دهد و گاهی در میان سبزیها تر کارند و در
بر وزن بر بدهد و در ترب و کاهو و چغندر و اسفاناخ و مانند آن نیز چنین میتواند بود
فلاحت رازیانج یعنی بادیان و سونف کاشتن این نیز وقت زیره بود فلاحت شبت
کاشتن شبت نیز مثل کاشتن رازیانه بود در وقت و ترتیب فلاحت نانخواه احوال
احوال این نیز مانند احوال شبت بود در امور معهوده فلاحت حبة السودا کیفیت زراعت
سیاه دانه همچو نانخواه است فلاحت حلبه و خشخاش موافق اند نخته سودا فلاحت
خردل کیفیت سپندان نیز بطریق با تقدم باشد فلاحت برشاد نیز مثل ما سبق فلاحت
حرف نیز دو نوع است یکی سفید از اصفهان گویند و دیگر سرخ و از اسفید میاید
فلاحت بهمن سفید و بقلة الحمقا و بزر قطونا مثل باشند بدیگر فلاحت سنداب بری میباشد
و کوهی و بستانی بری سیاه تر است از خردل فلاحت نعناع بری بود و بستانی
فلاحت کرفس از آنکه بکارند حاجت بکاشتن دیگر نشود و هر سال از بیخ وی
بر آید بهند یا کاشتنی بری میباشد و بستانی و وقت کاشتن آن وقت کاشتن
کرفس بود فلاحت سیر وقت کاشتن کاهو اواخر خریف بود یا اواسط آن
باید که از تخم کاهو بکارند که از برای تخم کاشته باشند تا مشقت ضایع نشود

فلاحت کمون زیره را بر جای بلند بکارند و آب بدهند اصلاً تا
خوبتر و بیشتر بود

خوشتر فلاحت شعیر جو مانند گندم بود در کاشتن و ترتیب کردن اما امید از
زراعت و رسیدن وی بیشتر از آن بود فلاحت حمص نخود را نیز باب روان و آب
باران کارند و او را باب بسیار حاجت شود خاصه در زمین که ریگ آمیز باشد
فلاحت باقلا این را در هر جای کارند بروید و حاجت باب و زبل ندارد خاصه در جایی
که قوی باشد و ترتیب کنند و بر زمینی که در وی باقلا کاشته شود قوت آن بیشتر
گردد و از این جهت وی را در میان نهالها کارند و ساق و برگ وی به منزله زبل بود
که در وقت گل کردن از وی احتراز نمایند تا عفونت گل آن ضرر نرساند فلاحت
ارزن طریق کاشتن دخن نیز مانند کاشتن گندم بود و از وی بیشتر کارند و زمین
آن نیک راست بکنند و سرگین بیندازند و بعضی وی را خوشه خرد میباشد و آن
سفید و سیاه و سرخ میباشد فلاحت ماش وقت زراعت ماش وقت پنبه
و سایر سبزیها بود و او را نیز بطریق ارزن کارند و ترتیب کنند فلاحت عدس
وقت زراعت عدس نیز همان وقت معهود بی تفاوت فلاحت کرسنه نیز مانند
عدس است فلاحت قطن وقت پنبه وقت شالی بود باید که زمین وی را از علف و
خار و خاشاک و سایر آنچه که مضر باشد نیک سازند پاک و نرم و کاشتن وی مانند
کاشتن سایر غلها بود و در بعضی جایها در زمین میخی فرو میبرند و در وی تخم می اندازند
و بخاک می پوشند بهتر میرویند و آن در هوای معتدل و هوای گرم بهتر رویند و
ثمر بیشتر دهد و در زمین نرم و باب شور و لطیف بود فلاحت کتان این را در
فصل خریف بعضی بکارند تا برای روغن و ریسمان یا برای پارچه کتان و آن
در بلاد روم و فرنگ بسیار میباشد و نیز فلاحت سمسم اوقات کاشتن کنجد

فلاحت شجر بهال درخت پیالسه کوچک میباشد و نهال پاره قندق میماند و برگ و بر
شاخ او میبرند و میسوزانند تا بهتر بار آورد و ثمره آن بمقدار نخود سیاه میباشد و با تخم بخورند
مقوی بود فلاحت درخت گردو و آن جاندار بود و در کنار بستانها کارند تا مانند دیوار
شود فلاحت برنج برنج در گرمسیرها بیشتر میباشند و اوقات کاشتن وی اوایل بهار بود
در غیر چمند باید که زمین را راست بکنند و هموار سازند و انچنان سازند که بر روی قریب
یک گز یا زیاده آب جمع شود و همیشه بماند و در بعضی بلاد اول تخم او را می خیسانند
چندانکه ریشه بدر می آورد و بعد از آن در زمین راست کرده بدست هموار میپاشند و در
بعضی جا اول تخم را جای مختصری کارند و آب میدهند چندانکه قریب یک دست یا زیاده
بلند شود پس از آنجا بر میکنند و در جایی که میخواهند بترتیب بدست می نشانند و بهتر
نفذ ر باید که علف زیادی که در میان آن بروید همه را پاک کنند و اگر حاجت بزبل
باشد بدهند و از آب شدید البرودت نگاه دارند و از آب تیره رنگ آمیز بلند آرند
که بسیار مناسب بود فلاحت حنطه گندم در گرمسیرها و در سردسیرها میباشد
و کاشتن آن گاهی باب جوی‌ها بود و او را ابسنج گویند و گاهی باب باران و او را
عذی خوانند و گاهی پابنی رود ها که در روی آن جمع شود و او را جنس مانند و بعضی هر چه
بغیر آب باشند او را دیمه گویند باید که زمین را از سنگ پاک بکنند و نرم سازند تا الف
کمتر برده و غله قوت بگیرد و ارتفاع بیشتر باید و بهترین خبرها که زمین را اگر اب بکنند نیکو
ترین بود که اگر او را چهار گاو میکشند و قریب یک گز در عرض و نیم گز در عمق بر میکشند
و زیر بالا میکنند و مسافت بسیار میرود و می آید و تخم را نیز باید که از غیر جنس جدا
کنند و از خاک و ریگ پاک کنند تا رستن آن یکسان شود و قوت وی بیشتر گردد و لونش

جاوه و بلاد هند میباشد و در آجام و لب آبها میروید و ساق آن سطبر بود و شاخهایش
بسیار و گلهایش سفید و گویند عود عروق اشجار است که بر میکنند و در زمین
دفن میکنند چندانکه خشبیه آن دور شود و خالص وی بماند و گویند ساقهای اشجار است
که قطعه قطعه میکنند و در دریا می اندازند آنچه رخو باشد تا مدت پنج شش ماه متعفن
میشود و آنچه خالص باشد سالم میماند بعد از آن سنگها می اندازند و قطعها مختلف
بدر می آورند فلاحت شجر النفسم این درخت در بیشها و بستانها می روید از آنچه
و شاخ در هر سه چهار سال یکبار میبرند باز از بیخ بدر می آید و از گل و میوه نباشد
فلاحت شجر ابنوس گویند این درخت سیاه می باشد و ملمع از سیاه و زرد و تخم
این شبیه تخم حنا بود و تا از سرخ و سفید تخم آن باشد فلفل بود و در بلاد هند نیز ملمع
میباشد و میوه آن بمقدار لیمو فلاحت شجر انبه درخت انبه بمقدار درخت
گردکان میباشد و بهترین اوقات کاشتن وی اوایل تابستان بود که وقت نزول
باران است و یا اواخر بهار که وقت رسیدن است و در هر زمین که باشد می روید
و باید که پاره زمین را است بکنند و سرگین چند اندازند و از تخم جنس نیک هر چند که میخواهند
در آن بکارند و بمقدار یکدست در زمین فرو برند بعد از یکسال و دو سال از آنجا یک
یک نیز بکنند و در بستانی که میخواهند ترتیب بکارند و یا اول زمین را نیک راست
بکنند و در هر بیست و سی گز یک حفره بکنند بمقدار یک گز و نیم و خاشاک و خاک را
با سرگین آمیخته در آن اندازند و چند تخم انبه را در میان آن نهند و در جوانب شهرها
بکارند و آن جنگلها و اندیرها که درخت شفتالو و بادام و گردکان میکنند در اینجا.
ممکن است اگرچه معهود و معتاد نباشد و گاهی در کنار کشتها بر می کارند و آب میبندند

۲ دانه در ظرفی جا داده سر [illegible]

سفید بود و رسیده اش فلفل سیاه و بستانی نیز بود و از وی شاخ بار نشاند و از
نیز بر آید فلاحت شجر قرنفل گویند درخت قرنفل مثل درخت تنبول و یاسمین بالا میشوند و
علک آن مانند علک البطم بود در قوت و گویند مثل علف دار زیانه و کاسنی میباشد در
صحرا میروید و در بستان نیز میکارند فلاحت شجر جوز الطیب گویند درخت جوز بو بمقدار
درخت سیب میباشد و میوه آن بشکل شفتالو و پوست ثمره وی بعد از پختن و خشک شدن
بسباسه میشود و گویند بسباسه گل وی است و جوز در اندرون وی و آن در صحرا و
بساتین میروید فلاحت شجر القاقله گویند درخت الاچی مانند درخت تاک و تنبول میباشد
و بر درخت دیگر می پیچد و ثمره آن در خوشه میروید و آن نیز در آجام و بساتین میباشند فلاحت
الشجر اللبانیه کیفیت این درخت نزدیک است بکیفیت درخت سابق فلاحت شجر تنبول درخت
تنبول بشکل درخت عشق پیچان میباشد و در بستانها و در بیشهها بر می آید و از وی تخم و
بچه میروید و آب بسیار میخواهد و تربیت بسیار میطلبد فلاحت شجر حب النیل که بهندی گل گنگوره
میگویند این درخت نیز مانند درخت تنبول بر درخت دیگر می پیچد و برگهای آن بزرگ میباشد
و در بیشهها و بستانها میروید فلاحت شجر دارچینی این درخت بسی بزرگ میباشد
و بلند و برگهای آن بسیار در بلاد چین بیشتر از بلاد هند میباشد و از وی کافور بر می آرند
و گویند درخت حرفه راکه هرد بالالمی هندی بود و مقدار انگشت سطبری و شاخهای
بسیار دارد و در صحراها و بستانها بروید و هر سال می برند و باز میروید فلاحت شجر
صندل این درخت بزرگ میباشد و شاخهای آن بسیار دارد و آن در آجام و بساطین
میروید و آن در ظرف جاوه بنام البیاض و جید الرائحه بود و او را مقاصری گویند و در
حدود سواحل و جزیره سیلان سرخ میباشد فلاحت شجر العود در نواحی سیلان و

گرد یک حفره میکنند و از ان انواع که در گردوی رسته باشد بارانبه برکنند و در مغاکی
از ان نصب میکنند و آب میدهند چندانکه بزرگ شود و میوه اورد فلاحت شجر نیشکر
نی شکر نیز در حکم درخت بود و کاشتن این چنانست که زمین را نیک راست میکنند مانند
باز و زبل بسیار میدهند و بعد از ان جویها میکنند مانند جویهای باز و آب میدهند چندانکه
سبز شود پس میگیرند نیشکر پاره بمقدار یکدست باز باز ده وصله می میکنند و در انجای کاره
نزدیک یکدیگر و در هر چند روز که ان قصب نشینده اند دیگر میدهند چندانکه برسد و سرما
نخورد فلاحت شجر الخیار درخت خیار چنبر بمقدار درخت سیب می باشد و ساق
املس و شاخهایش بسیار و برگهایش خورد و در بیشها نیز دیده و از وی در بیشها و کنار
کشتها و بستانها میروید و ان را بتخم و بچه و شاخ میکارند فلاحت شجر سپستان درخت ان
بسیار و برگهایش ریزه گاهی بتخم میرویند و گاهی چرهای بزرگ میباشند فلاحت
شجر البلیلج درخت بلیله مانند درخت سیب میباشد در مقدار و شاخ و برگ و میوه و
از وی بتخم میکارند و بچه او غرس میکنند و شاخ بوته می بازند فلاحت شجر الهلیلج درخت
هلیله مانند درخت بلیله بود و در بیشها بیشتر میباشند و در بستانها نیز کارند از تخم و بچه و
شاخ فلاحت شجر الاملج درخت املیه قریب بدرخت اجاص بود و ان اکثر در بیشها میباشند
و در بستانها نیز میرویند فلاحت شجر البلادر درخت بلادر بمقدار درخت بطم میباشد و
شاخهای ان بسیار و برگهایش بزرگ و در بیشها بیشتر میباشند و در کشتها و بستانها
نیز میرویند از تخم و شاخ و بچه بلادر بشکل [illegible] اما با خوشه و در میان طرف و چون
ان طرف خشک شود مانند قیر سیاه گردد فلاحت شجر فلفل درخت فلفل مثل درخت
انگور و تنبول بر درخت دیگری می پیچد و برگهایش خورد دارد و بار رسیده ان فلفل سفید

یک گز ده در هر دو گز حفره کنند بمقدار یکدست عمق یا چهار انگشت و بعد ازان در هر نیم گزی یک ازان

وصله ها دفن کنند و بخاک بپوشند و آب بدهند از تخم و وصله بچهای بسیار برآید هر بار که آب در

زمین فرو نشیند زمین را نرم بکنند و در شب آن پاره ریگ نرم مایل آنچه بشندازند و در

گل آب بسیار دهند و اگر درخت دیگر پیوند بکنند بر دهد مثل درخت بید و بید فلاحت

شجر النسرین درخت نسرین بچهای یکساله یا دوساله کارند و شاخها بر درخت دیگر پیوند بکنند

مثل درخت ترنج و نارنج و سیب و شفتالو و این بغایت نیکو بود و بعضی اینها نیز پیوند شوند فلاحت

شجر الیاسمین کاشتن این نیز مثل کاشتن نسرین بود از وی بچها کارند و شاخها بر درخت

نارنج و لیمو پیوند بکنند و بعضی اینها نیز ممکن بود فلاحت شجر الارغوان درخت ارغوان نیز

بزرگ نمی باشد و در کوهها میباشد و در بستانها نیز کارند از برای زینت و منفعت و از وی

بچه و شاخ برند و بر درخت دیگر پیوند نشود مانند درخت بید و بید فلاحت شجر الگلنار

درخت گلنار و انار بری فارسی میباشد و مصری و او را ثمر نمیباشد بغیر گل و ازان در باغها نیز

کارند فلاحت شجر النارجیل درخت جوز هندی مثل درخت خرما بود و از وی بلندتر بود

ساق آن پاک بود و شاخهای دراز تر و برگش پهن تر و خواهند که وی را بکارند از میوه تازه آن

چند تا بگیرند و در جای عریض بکنند و هر روز بر آن آب بپاشند چندانکه از وی دانه برآید

مانند پیاز بعد ازان در جای مناسب بمقدار نیم گز یا بیشتر مغاکی بکنند و او را در آن بنهند و زمین

و بگذارند چندانکه بروید و بلند شود بعد ازان ازانجا نقل کنند و باز در انجا بگذارند و باید که در هر

سال شاخهای زیادتی وی را پاک کنند تا ساق آن قوت بگیرد و بلند شود فلاحت شجر الموز

درخت کیله در شهرها و بستانها میشود و کاهی تخم وی را کارند و اگر بچه آن بنشانند

طریق کاشتن وی چنانست که زمین نیک آماده بکنند و نرم بسپارند و در هر جا

بروید و در زمین شوره سفید رنگ و غیر شوره سرخ رنگ و در بعضی زمین ها قوی
و مناسب بغایت بزرگ میباشد چنانکه از ان ستونها و درها راست میکنند و در
بعضی بلاد از ان اثل گویند پس اگر این نوع بکارند بزرگ شود و سالها بماند و سایه
دهد و نفع رساند فلاحت شجر الاترج درخت ترنج در گرم سیرها بیشتر میباشد و اگر در
سیرها بکارند از سرما سخت نگاه دارند و از وی تخم و بچه میکارند و شاخ ان در درخت
درخت دیگر پیوند میکنند مانند درخت نارنج و لیمو و باین اعتبار او را انواع بسیار
میشود و لذت ان تفاوت میکند خاصه بتفاوت ان و هوا و زمین هر ملک فلاحت
شجر النارنج این درخت در گرم سیرها میباشد و گویند میوه این قریب چهار ربیع بر درخت
میماند و هر چه ان بیشتر می باشد حبه اش خوردتر باشد و لونش زردتر و هر چه
سال کمتر باشد حبه اش بزرگتر بود و لونش سبزتر پس اگر خواهند که بکارند از
تخم نارنج خوب رسیده و بزرگ بگیرند اگر دو ساله باشد بهتر بود و بعد از ان
در زمین نرم و خوب و راست کرده و زبل داده بکارند و آب بدهند و در روز
زیر آفتاب بنهند و در شب سرما بخانه برند بهتر باشد خاصه در سردسیرها
و شاخ ان بدرخت ابی و امرود پیوند شود فلاحت شجر اللیمو این درخت
در گرم سیرها میباشد و اگر در سردسیرها بکارند از سرما محافظت تمام نمایند
و احوال وی در کاشتن تخم و نشاندن بچه و پیوند کردن شاخ مانند احوال نارنج
بود فلاحت شجر الورد درخت گل را از تخم و بچه و شاخ میروید و تخم و براو
زبره زاری بکارند و شاخ یکساله و دو ساله را با ریشه بر کنند و در جای
میشانند و با خود ساق و ریشه هر یکی را وصله وصله کنند و در زمین راست کرده

درخت بسیار بزرگ نمیباشد در کوهها و بستانها نیز و بید و بستانی بهتر بود و کیفیت

کاشتن وی قریب است بکیفیت کاشتن رز تاک و مانند آن فلاحت شجر الصنوبر این درخت

در طرف چمن بسی بزرگ میباشد و بلند و در بستانها و بیشهها نیز و بید و لفظ سفید را

ازان بیرمی ارند فلاحت شجر البرد این درخت در کوهها و بستانها می باشد در کنار

جویها می کارند فلاحت شجر الدلب درخت چنار پس درخت چنار مبارکست ساق

آن بزرگ و دلکش چوب و قدش زیبا و عمرش دراز و از انواع که در کردن آن ریشه باشند

ملکیله لا بالا باید و بیلدار جای بکارند و اگر سبب نقصان در اشکافتن یا خورد کوبند

و بعد از آن بنشانند بهتر بروید و آن چون بزرگ شود حاجتش و تربیت کمتر باشد

و اگر در کنار دیوارها باغ یا لبها جوی یا اطراف را بکارند بهتر بود فلاحت شجر البیاض

درخت سپید از نسبی بزرگ میباشد و غراس آن مانند غراس چنار بود و آن در

کنار جویهایی و بستانها و در گذر سیلها بهتر روید و زود بزرگ شود و ریگ را

نمیخواهد فلاحت شجر الخلاف درخت بید بسیار بزرگ نمیباشد و بهترین اوقات

کاشتن وی فصل بهار بود و مناسبترین زمینها از برای آن لبهای جوی و حوض

و خندق و جاهایی که آب اردی جمع شود و در غیر اینها نیز بکارند و اگر در فصل تابستان

بکارند باید که وقتی که ببرند بنشانند و آب دهند و یا در لبها جو بنشانند تا بروید

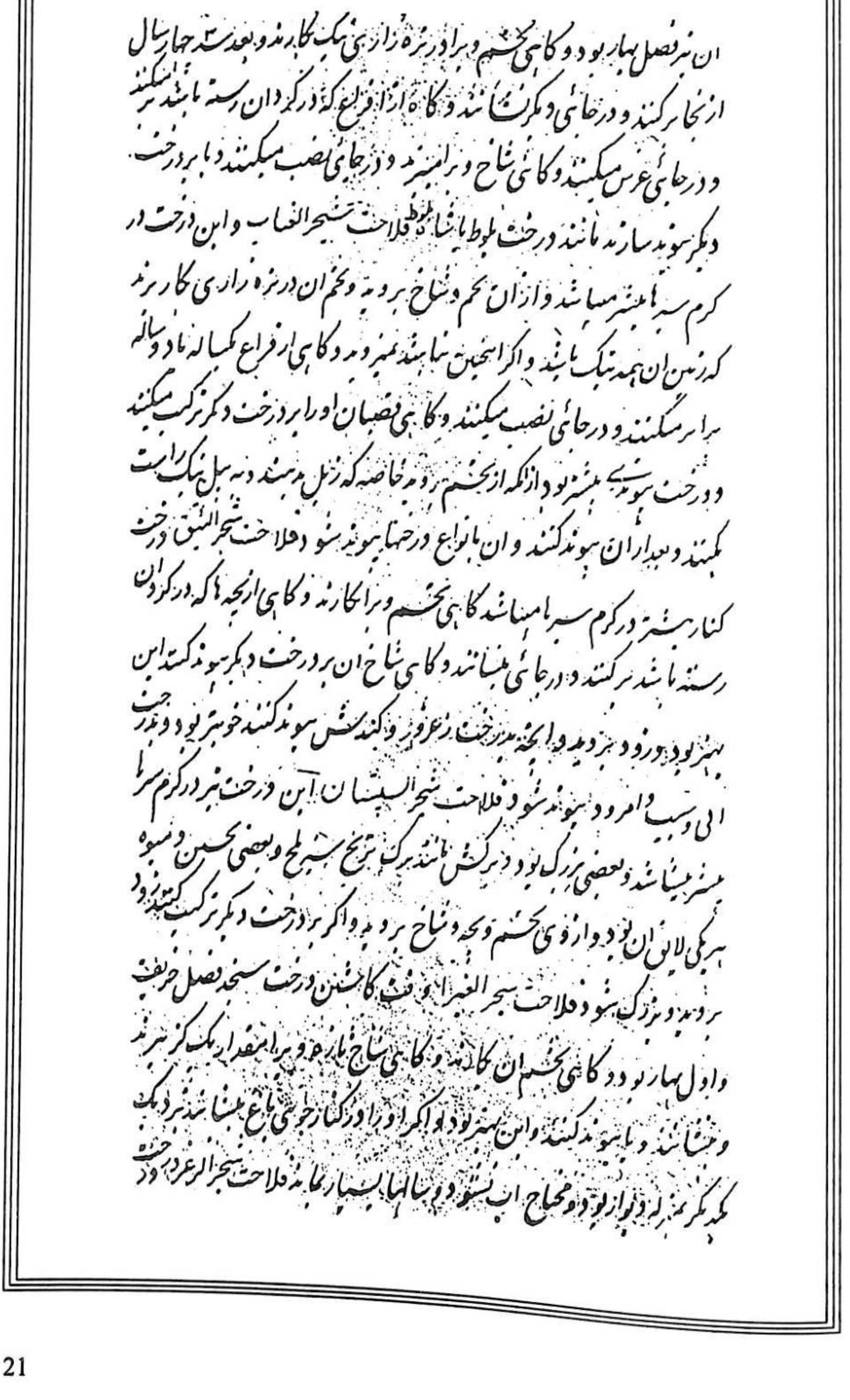
و خطا نکند و آن انواع است بعضی مایل بود بزردی و بعضی بسیاهی و این همه محکم

تر بود و نوع دیگر هست که او را بید مشک گویند و هر سال از وی عرق بگیرند و ساق

آن هرچند کوته تر بود قوت آن بیشتر بود و گلش بهتر و اگر میوهها که بزیر بید بود میکنند

لطیف و خوش لذت شود فلاحت شجر الطرفا درخت گز در زمینهای شور و غیر شور

تفاح بری در کوهها میباشد و اگر از انواع ان برکنند و در بستانها بکارند بهتر بر دهد
و میوه خوشتر اید و اگر بر درخت دیگر از درختهای میوه مثل درخت آبی و امرود پیوند
کنند میوه اش بهتر از اول بود و اگر برعکس کنند نیز نهایت خوب شود فلاحت شجر الکندش
درخت کندش نیز در بیشها و بستانها می باشد و میوه بستانی نیز بود و بزرگ و خوش طعم و خوش
لذت خاصه که درخت آبی پیوند سازند خصوصا انکه بستانی را پیوند سازند ثمره نهایت
خوب شود و اما تازه و نازک دارد و نیز گاهی بچه بکارند و گاهی شاخ بنشانند و بعد
از ان ترکیب کنند و ثمره این نوع بهتر بود و زود برسد و اگر دانه ان در تره زاری
بکارند نیز روید فلاحت شجر البطم درخت حبة الخضرا در کوهها میباشد و اگر در بستانها
نیز بکارند بروید و ثمراتش بهتر شود و احوال کاشتن وی مانند احوال کاشتن فستق
بود و بادام و اگر با انها ترکیب کنند نهایت خوب شود فلاحت الاس درمورد
نیز در کوهها میباشد و در بستانها نیز بکارند بر درختهای دیگر پیوند کنند مانند درخت
حبة الخضرا فلاحت شجر الانبرباریس درخت زرشک در کوهها و بیشهها می باشد و اگر
در باغها نیز بکارند از ان بهتر شود و باید که یکساله انواع وی را با ریشه برکنند و در جایی
راست کرده بنشانند و هر سال شاخهای ان نرم بکنند و زبل بر نهند و قضبان زواید
بلا فایده همه را ببرند و اگر شاخ ان برکنند و بر درخت انار یا توت پیوند کنند نهایت
نیک شود و پیوند ان بر درختهای دیگر نیز ممکن بود و اگر تخم پیوندی را بکارند و بعد از ان
از انجا بجای دیگر نقل کنند میوه اش بهتر شود و اگر در کنار باغها یا جویها بکارند بجای
دیوار شود فلاحت شجر الحنا این درخت در گرمسیرها بیشتر میباشد و صحراها و بستانها
مثمر و بزرگ بسیار نمیباشد و برگهای ان سبز تیره بود فلاحت شجر السماق این درخت



ان نیز فصل بهار بود و کاهی تخم وی را در بزه زاری تنک کارند و بعد سه چهار سال
از انجا بر کنند و در جائی دیکر نشانند و کاه از انواع که در کرد ان رسته باشند بر میکنند
و در جائی غرس میکنند و کاهی شاخ وی را میبرند و در جائی نصب میکنند و یا بر درخت
دیکر پیوند سازند مانند درخت بلوط یا شاه بلوط فلاحت شجر العناب و این درخت در
کرم سیر یا بیشتر میباشد و از ان تخم و شاخ بروید و تخم ان در بزه زاری کارند
که زمین ان همه تنک باشد و اکر اینچنین نباشد نمیروید و کاهی از انواع یکساله یا دو ساله
برا بر میکنند و در جائی نصب میکنند و کاهی قضبان او را بر درخت دیکر ترکیب میکنند
و درخت پیوندی بیشتر بود و انکه از تخم روید خاصه که زبل دهند و نهال نیک را بت
بکنند و بعد از ان پیوند کنند و ان با انواع درختها پیوند شود فلاحت شجر النبق درخت
کنار هست در کرم سیرها میباشد کاهی تخم وی را کارند و کاهی از بچه ها که در کرد ان
رسته باشد بر کنند و در جائی بنشانند و کاهی شاخ ان بر درخت دیکر پیوند کنند و این
بهتر بود و زود بر دهد و انچه بر درخت زعرور و کنارش پیوند کنند خوبتر بود و بر درخت
الی و سیب و امرود پیوند شود فلاحت شجر السپستان این درخت نیز در کرم سیرها
بیشتر میباشد و بعضی بزرک بود و برکش مانند برک ترنج شبیه بلح و بعضی خشن و میوه
هر یکی لایق ان بود و از وی تخم و بچه و شاخ بروید و اکر بر درخت دیکر ترکیب کنند زود
بر دهد و بزرک شود فلاحت شجر الغبیرا و وقت کاشتن درخت سنجد فصل خریف
و اول بهار بود و کاهی تخم ان کارند و کاهی شاخ پاره وی را بمقدار یک کز ببرند
و بنشانند و یا پیوند کنند و این بهتر بود و اکر او را در کنار جوی باغ بنشانند نزدیک
یکدیکر بمنزله دیوار بود و محتاج اب نشود و سالها بسیار بماند فلاحت شجر الزعرور درخت و د

بخبد و بعد از ان بکارند پوست میوه بغایت تنک شود و مثل این در بادام و امثال
ان نیز بکنند و اگر شاخ دو برابر درخت دیگر ترکیب کنند از ان زود تر بار اورد و
اگر درخت وی را در وقتی که میوه ارد با اهن باریک سوراخ بکنند و اهن را در ان
جا بگذارند میوه ان سالم بماند و پوستش تنک شود و این درخت قابل پیوند بود بهر
درخت که میوه ان مانند این باشد مثل درخت بادام و فستق و امثال انها و باید که
بچه دو ساله وی را بگیرند و ریشه انرا ببرند و بنشانند و بعد از ان پیوند کنند و اگر
شاخهای درختها که بر یکدیگر نزدیک باشند بعضی را بر بعضی ترکیب کنند بهتر در بار
میشود و اگر خواهند که زود بزرگ شود و از همه بیشتر ثمر دهد و خوشه خوشه اید
یک مغاکی بکنند و پاره زبل باریک امیخته در ان بیندازند و بعد از ان چند عدد گردکان
را بگیرند ده عدد باشد یا یازده تا کم و در ان بنهند پس خوشه و خاک پر کنند
و یک کوزه شکسته گردن باریک بر بالای ان بدارند چنانکه بعد از رستن همه از دهن
تنک ان برایند و یکی شوند و بعد از دو سه سال همه را بریسمان محکم ببندند
و یکی بمالند عرض حاصل شود فلاحت شجر الفستق درخت پسته در سرد
سیرها و گرم سیرها میشود و حاجت باب و زبل بسیار ندارد و بهترین اوقات
کاشتن وی فصل بهار بود چون خواهند که وی را بکارند از فراغ یکساله یا دو ساله
یا زیاده بگیرند و در جایی بنشانند و اگر تخم بزرگ ان بگیرند و سر وی بشکافند و مغز
ان بر اورند و در پشم پاره کرده بگذارند و سرش بالا کنند مغز ان زیاده شود و
پوستش تنک شود ان بر درخت لوز و جوز نیز پیوند شود فلاحت شجر الفندق درخت
فندق نیز در مواضع حاره و بارده میباشد و بیشه‌ها و سبانها میروید وقت کاشتن ان

بر دو بند و انواع بذر را ورد و بعد از آن انجا بر کنند و بجای دیگر نقل کنند فلاحت شجر شاه بلوط

این درخت نیز در سردسیرها می باشد و بهترین اوقات کاشتن وی فصل بهار بود و در

خزان نیز بکارند و تخم آن مرده بود و از انواع وی بار رسته کنده بنشانند و قضبان آن بر

درخت دیگر ترکیب نمایند درخت سیب و امرود و بادام و باید که شاه بلوط را در تمام زمستان

در ریگ نمناکی نه کنند و در وقت بهار بیرون آورند چنانچه ریشه کرده باشند بنشانند تخم باقلا

و خیار زه و امثال اینها و بعد از آن بکارند زود بر دمد و بزرگ شود فلاحت شجر اللوز

بهترین اوقات کاشتن درخت بادام فصل خریف بود و اول بهار و بهترین زمین ها

برای وی گرمسیرها بود و جزیرها و دریا و آن نغز و زبل کرده و باید که تخم وی را آبار

بکنند و سه روز در آب بخیسانند و بعد در آن در جایی بکارند بر وجهی که سر سران بطرف

شمال باشند و در آنجا بگذارند چند آنکه بزرگ شود و گاهی از قضبان تازه تا بالای آن

درخت دو شاخه گیرند و جایی نصب کنند و این نوع از همه بهتر بود و از آنها و گاهی شاخهای

وی برابر درخت دیگر ترکیب نمایند و باید که آن شاخهای اصلی باشند نه بونه‌ی و اگر سرگین

خوک را بکوبند و در بیخ درخت ریزند بادام آن شیرین شود و اگر بادام بشکافند و در مغز

وی نقشی بکنند و در ریسمان بندند و بعد از آن بکارند و آن نقش در ثمره آن ظاهر شود

و اگر درخت بادام تلخ را بر درخت بادام شیرین پیوند کنند میوه‌اش شیرین شود فلاحت

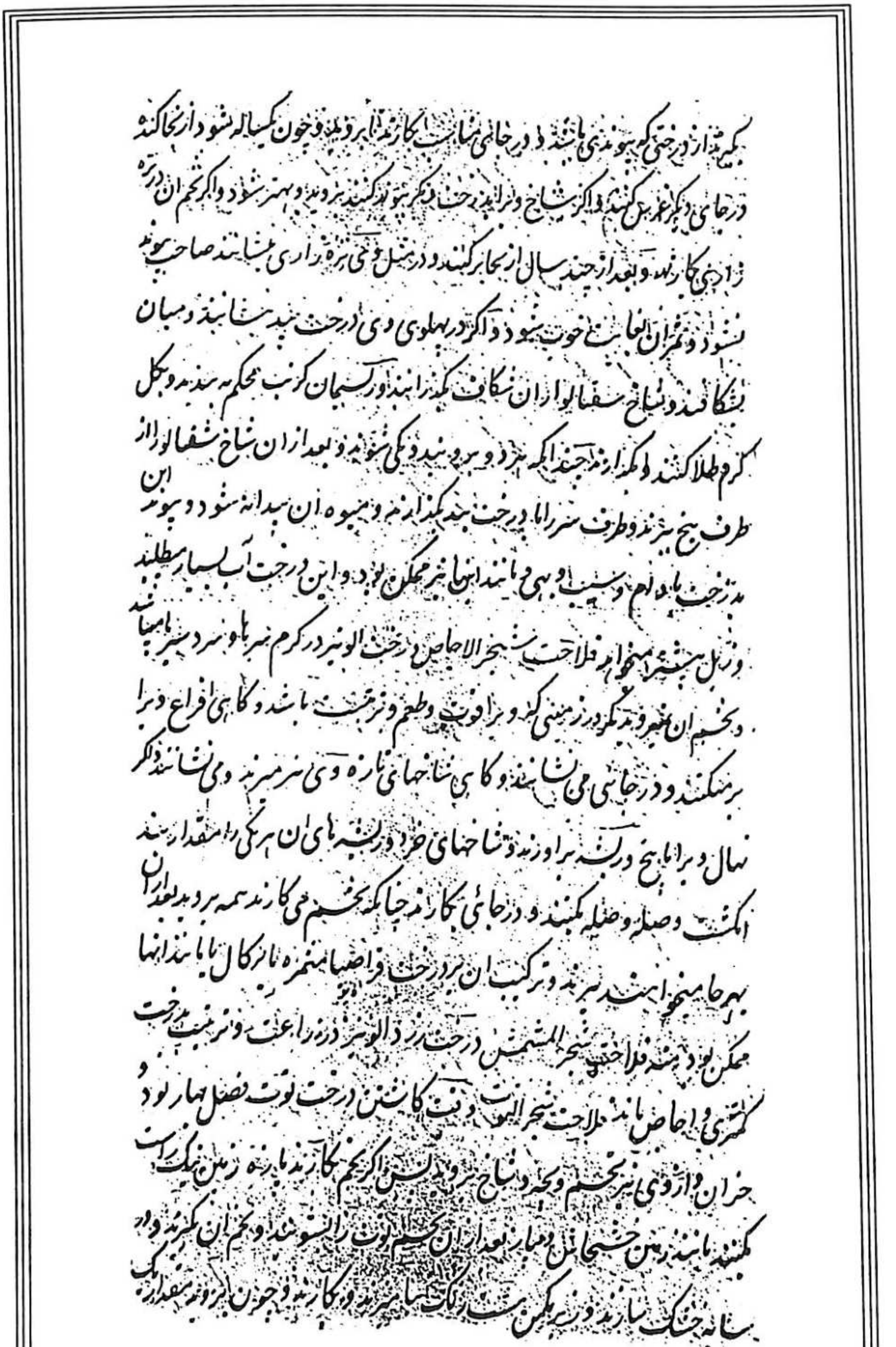
الجوز بهترین اوقات کاشتن درخت گردکان فصل زمستان بود و بهترین زمینها

برای آن سردسیرها باشند و یا بوده و باید که گردکان را سه روز در شراب کهن

در [illegible] گردکان بخیسانند و بعد از آن بکارند تا بهتر شود که بیاورند و پوست آن شکسته

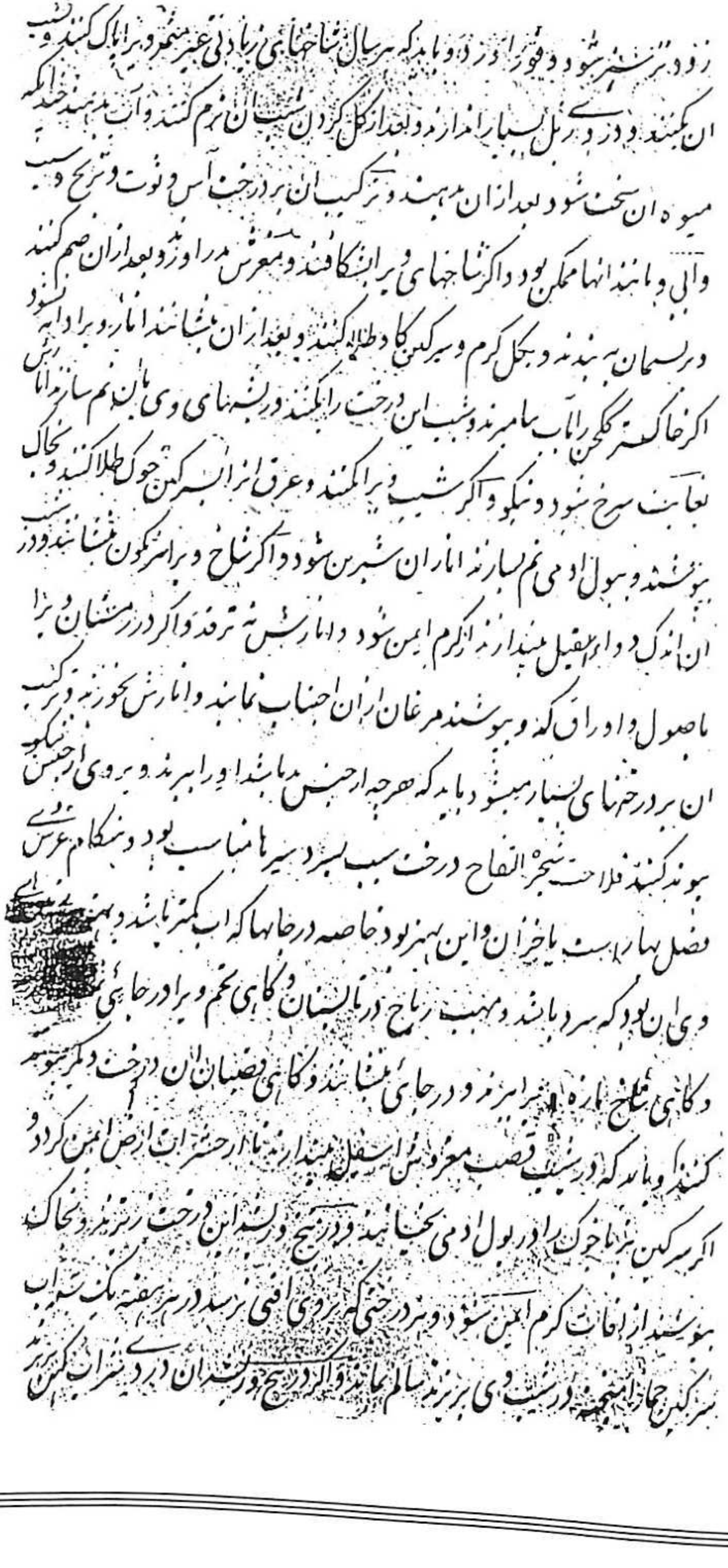
برده و اگر گردکان نرمی شکنند و مغز آن درست بدر آورند و با پشم یا پاره‌ها برگ انگور

کر بار داده بلند شود و از آنجا یک یک برکنند و در جائی دیگر بنشانند بر وجهی که مسطور شد
و گاهی شاخ تازه و بر میگیرند خاصه از درخت که یکساله بیشتر شاخهائی او را همه ببرند
باشند و مقدار یک گز قطعه قطعه کنند بعد از آن زمین را راست بکنند و زبل بدهند
و در وسط جویها بکنند مانند جویها خربزه و در هر طرف جویها یک یک از آن شاخها
بدست فرو برند و آب بدهند تا بروید و بعد از دو سال هر کدام که بزرگ باشند بر کنند
و در جای دیگر بنشانند و آنچه باقی بماند در میان دیگر همچنین بکنند تا وقتی که آخر شود و آنچه
بهتر باشد در آنجا بر حال خود بگذارند و اگر در شیب این درخت تراب ثقیل بدهند از بهر
نافع بود و بهترین انواع ترکیب وی آنست که بر درخت شاه بلوط باشد و اگر توت
سیاه را با توت سفید پیوند کنند میوه آن سفید شود و اگر بر عکس کنند سیاه شود
درخت خرتوت در زمین بروید و محتاج ترتیب بسیار نباشد و سوید وی نیکو بود
و ثمره اش بسیار بماند و بعضی در عقب بعضی برسد لیکن پیوند آن بدرختی میباید که مثل
آن دراز عمر باشد مانند درخت چنار فلاحت شجر القراصیا درخت آلو بالو در سرد
سیرها نهایت بزرگ میباشند و میوه اش خوب و اکثر احوال کاشتن وی مثل احوال
کاشتن اجاص بود و از آن تخم بکارند و بچه بنشانند و شاخ پیوند کنند بر درختی
که نهایت قوی باشند و از بیخ ببرند و جوانبشان شق کنند و شاخهای آن پیوند
سازند و بگل بسیار بگیرند و اگر بجنس خود ترکیب کنند قریب سه چهار گز ببرند و بر آن
ترکیب سازند فلاحت شجر البلوط این درخت در کوهها و بیشه‌ها میباشند و اگر
در کنار زراعتها و بستانها بکارند بهتر از آن شود و آن بغیر آب سر بروید و بار
بهتر بود و کاشتن آن مثل کاشتن شاه بلوط در اوقات باید که اول بلوط را در جائی بکارند که



بگیرند و از درختی که پیوندی باشد در جایی مناسب بکارند تا بر دهد و چون یکساله شود از آنجا کنده
در جای دیگر غرس کنند و اگر شاخ وی را بدرخت دیگر پیوند کنند بر دهد و بهتر شود و اگر تخم آن در تره
زاری کارند و بعد از چند سال از آنجا برکنند و در محل خوبی تره زاری بنشانند صاحب پیوند
نشود و ثمر آن بغایت خوب شود و اگر در پهلوی وی درخت بید نشانند و میان
بشکافند و شاخ شفتالو از آن شکاف بگذرانند و ریسمان کرنب محکم ببندند و بگل
گرم طلا کنند و بگذارند چند گاه که بهم بروند و یکی شوند و بعد از آن شاخ شفتالو را از
این
طرف بیخ ببرند و طرف سر را با درخت بید بگذارند و میوه آن بیدانه شود و پیوند
بدرخت بادام و سیب و بهی و مانند اینها نیز ممکن بود و این درخت آب بسیار طلبد
و زبل بیشتر میخواهد فلاحت شجر الاجاص درخت آلو نیز در گرمسیر باشد و سردسیر با میانه باشد
و تخم آن متغیر و بد گردد در زمینی که وی را قوت و طعم و تربیت باشد و گاهی افراع در را
بر میکنند و در جایی می‌نشانند و گاهی شاخهای تازه وی بر میبرند و می‌نشانند دیگر
نهال وی را با بیخ درسته برآورند و شاخهای خرد و رشته‌های آن هر یکی را بمقدار بند
انگشت وصله وصله بکنند و در جایی بکارند چنانکه تخم می‌کارند همه بر دهد بعد از آن
بهر جا میخواهند نشانند و ترکیب این بر درخت قراصیا متمره تا زرکال یا باشد اینها
توت
ممکن بود بشنوند فلاحت شجر المشمش درخت زردالو نیز در زراعت و تربیت بدرخت
کمثری و اجاص باشد فلاحت شجر التوت و بید کاشتن درخت توت فصل بهار بود و
خزان و از وی نیز تخم و بیخ و شاخ بروید لیکن اگر تخم بکارند باید زمین نیک راست
بکنند مانند زمین خشخاش و هموار بعد از آن تخم توت را نشو نهند و تخم آن بگیرند و در
سایه خشک سازند در زیر زمین نشت زنگ نیسا سرند و بکارند و چون برویند بمقدار یک

و بپوشنند ثمره وی شیرین شود و اگر در هر سال چهار بار در اصول ان بول آدمی بریزند
شکوفهای سرخ شود و بول ادمی با این صورت بسیار موافق بود نهالها با بخرهای دیگر و
بهترین درختها از برای پیوند درخت ترنج و اجاص بود زیرا که دو ثمره دهد منه فلاحت
شجرة الکمثری درخت امرود در تر بستر و زمینها مناسب بود و از وی گاهی تخم بکارند و
قریب یک گز شود و ازانجا بجای دیگر نقل کنند و گاهی بچه که از بیخ و ریشه ان بر آید
و برا برکنند و در جای مناسب بنشانند و گاهی شاخ ان در زمین بجا باشند چند انکه
ریشه بگیرد و بعد از ان بجای دیگر برند و مناسب ترین زبلها برای وی زبل آدمی
بود و حیوانات بخشن و خون گوسفند و گاهی شاخ و برا در درخت دیگر برند و مناسب
ترین درختها برای پیوندی درخت بهی بود و درختها که مانی باشند در بستانها در
و با درخت زعرور و انار پیوند کنند منه فلاحت شجرة السفرجل از درخت بهی
تخم برویند و از بچه که در حوالی ان ریشه باشند بکارند خاصه که از درخت پیوندی
باشند و اگر فراخ نباشد قضبان و برا در زمین بجا باشند تا برویند و ریشه بگیرد و بعد از
یکسال ازانجا بریده و برکنده بجای دیگر نقل کنند و اگر شاخ تازه و برا ببرند و در
زمین بنشانند همچون شاخ بیدان برویند و این درخت بسیار آب میخواهد و در هر
بار که آب دهند چنان کنند که قریب یک گز از ساق وی در آب باشند تا ثمره ان
بزرگ و نیکو گردد و اگر شاخ وی را در درخت بید یا امرود و یا زعرور و نار پیوند
کنند محتاج باب بسیار نشود منه فلاحت شجرة الخوخ بهترین وقت کاشتن درخت
شفتالو فصل بهار بود و بهترین جایها از برای وی جائی بود که نمناک باشد و هر وقت
در جائیکه بهائی آب دادن بران اسان بود مانند کنار جویها لیس بامد که تخم وی را بگیرند

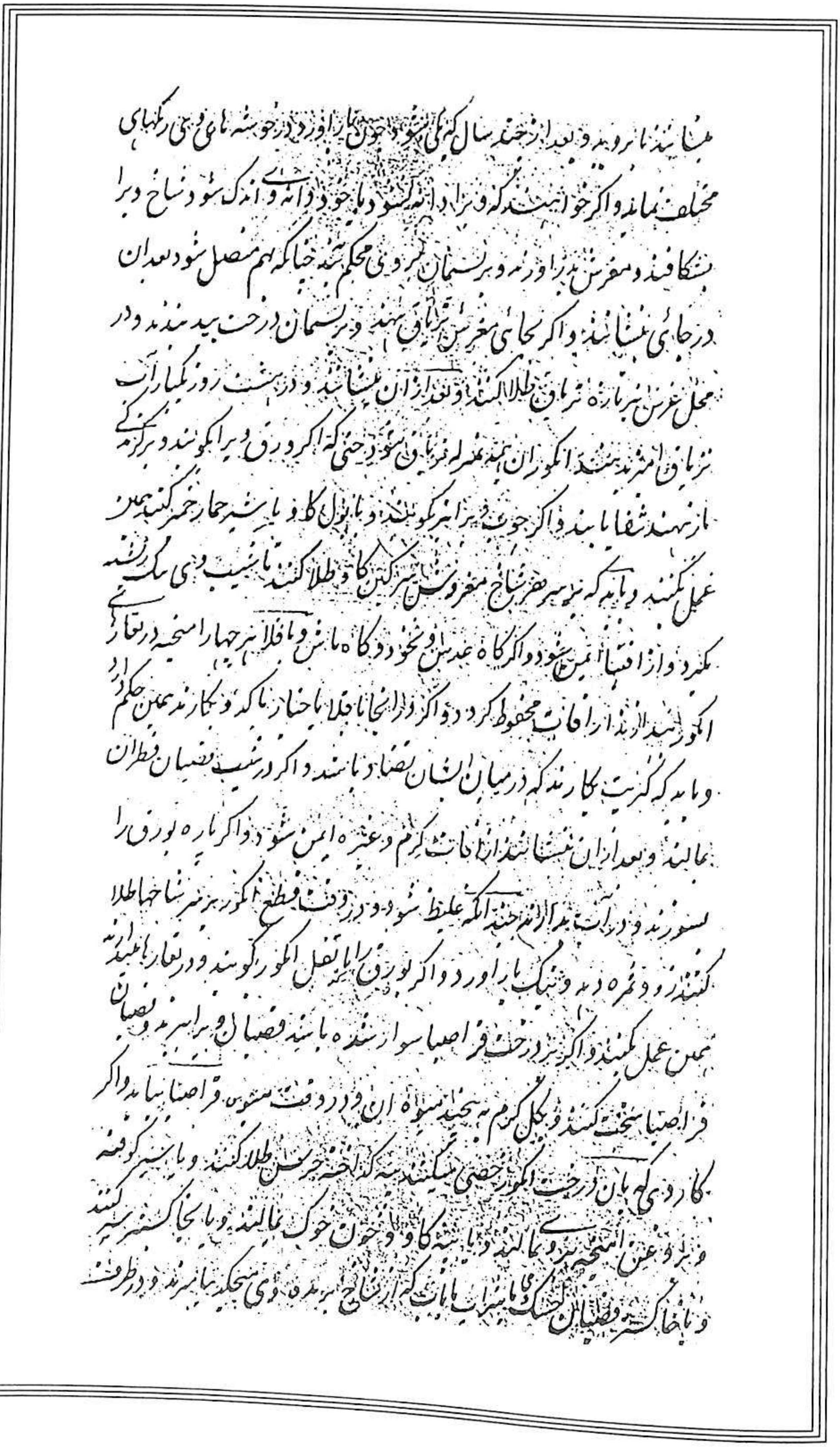


زود بر سبز شود و فوراً دزد و باید که هر سال شاخهای زیادتی غیر مثمر وی را پاک کنند و سیب
ان بکنند و در دی زبل بسیار اندازند و بعد از گل کردن شکوفه ان نرم کنند و آب بدهند چندانکه
میوه ان سخت شود و بعد از ان بدهند و ترکیب ان بر درخت آس و توت و ترنج و سیب
و آلی و مانند انها ممکن بود و اگر شاخهای وی را بشکافند و معرش در او زنند و بعد از ان ضم کنند
در ریسمان ببندند و بگل گرم و سرگین گاو طلا کنند و بعد از ان بنشانند انار و برا دانه نشود
اگر خاکستر گلخن را با آب بیامیزند و شب این درخت را افکنند در ریشه های وی بان نرم سازند انارش
بغایت سرخ شود و نیکو و اگر شیب وی را افکنند و عرق ان از سرگین چون طلا کنند و بخاک
بپوشند و بول آدمی بسیار دهند انار ان شیرین شود و اگر شاخ وی را سرنگون بنشانند و در شیب
ان اندک دوای اسقیل بیندازند از کرم ایمن شود و انارش نه ترقد و اگر در زمستان وی را
با صول و اوراق کهنه بپوشند مرغان ازان اجتناب نمایند و انارش نخورند و ترکیب
ان بر درختهای بسیار میشود باید که هرچه از جنس وی باشد او را بر بندد و بر وی از جنس نیکو
پیوند کنند فلاحت شجرة التفاح درخت سیب به سردسیر مناسب بود و هنگام غرس وی
فصل بهار است یا خزان و این بهتر بود خاصه در جاها که آب کمتر باشد و بهترین جای
وی ان بود که سرد باشد و مهب ریاح در تابستان و گاهی تخم وی را در جای
و گاهی شاخ پاره وی را بر زمین در جای بنشانند و گاهی قضبان ان درخت دیگر پیوند
کنند و باید که در نشیب قضبش معروش اسقیل بیندازند تا از حشرات ارض ایمن گردد و
اگر سرگین بز با خون را در بول آدمی بخیسانند و در زیج و در بن این درخت ریزند و بخاک
بپوشند از آفات کرم ایمن شود و هر درختی که بروی آفتی رسد در هر هفته یک بار آب
سرگین حمار آمیخته در بن وی ریزند سالم بماند و اگر در زیج و در بن ان در دیگر سرگین ریزند

او بسیار شود ویرا سوراخ کنند و در شاخ پاره را از درخت بسیار بار بیاورند و هر یکی
را در طرف ان سوراخ کنند و بنهند بر وجهی که در میان هر دو فرجه نماند بعد از ان با خیاط
ببندند چنانچه هیچ کدام ضرر نرسد و بر دو طرف سوراخ را بگل گرم بگیرند و بگذارند و اگر
در حین کاشتن زیتون در نشیب وی قدری گاه بنهند زود بر وید و باید که هر سال یکبار
گرد او را بکنند و پاره سرگین و زبل در وی بیندازند و اگر برگهای ان بسیار باشد و بارش
اندک شیره برگ زیتون صحرائی با شیره بلوط را بگیرند و در هر چهار روز یکبار در نشیب
وی بریزند ثمره ان بسیار شود و برگ اندک و اگر بار ان بریزد از علفی که او را اقطاحه
گویند باحی است بکنند و بر بالای شاخهای بنهند ثمره ان نریزد و ترکیب ان بر دو
وجه بود یکی انکه او را سوراخ کنند و شاخ بر وی پیوند سازند و بالای ان کوزه پر آب
بیاویزند بر وجهی که بر ان بچکد و دیگر انکه نشیب درخت را از روی زمین بشکافند
و یک شاخ بر ان ترکیب سازند و اگر وی را از انگور یا سیب پیوند کنند طعم زیت وی بطعم
انها باشد منه فلاحت شجرة الرمان درین درخت انار نیز درخت شریف است بمواضع حاره
و هوای معتدل مناسب بود و بهترین زمین با کاشتن وی زمینی باشد که گرم و خشک
بود و از وی نیز تخم و بچه و شاخ بروید چون خواهند که بکارند زمین را نیک راست
بکنند و در وی زبل بسیار بیندازند بعد از ان در هر سه چهار گز یک حفره بکنند و در
هر یکی چند تا شاخ بنشانند مقابل افتاب و نصف او خوابانیده و آب بدهند و باید
که ان شاخ از جنس نیک باشند و از بالای درخت مثمر و بدست شکسته باشند و باید
که از حوالی و جوانب درخت باشد و یا غیر مثمر و یا بکارد بریده باشند و اگر دیر
چند گاهی در زیر خاک نم بدارند و از محل بمحل دور بیاورده باشند و بعد از ان بنشانند

کنند یا بسیار او رزد و اگر ورق زیتون کوبند و عصاره آن بر درخت انجیر بپاشند همین
خاصیت دهد و هر درختی را که بار آن سر بر زده ریزد برا لگنند چند انگیخ در شبه ان ظاهر شود
بعد از آن سنگ که بوته طلا کنند و یا پاره نمک در آن چال بریزند بارش نگاه دارد و زود برسد
و اگر قضبان انجیر بری را بگیرند و در روغن کنجد و خم مدت شش روز بخیسانند و بعد از آن
غرس کنند دانه ندهند میوه آن لطیف تر شود از بستانی و اگر زرق طور و فلفل را با روغن
بیامیزند و در انجیر جام طلا کنند زود برد و اگر در بیخ این درخت از سوزن یا چیزی باشد آن
بنویسند بر میوه ظاهر شود منه فلاحت شجر الزیتون از درختهای شریف است در کوه
و دشته نانز سبز و به بهترین زمینها از برای وی زمین باشد ساده و زخو که در وی رطوبت نباشد
و زمین سیخ و شب مناسب بود و از وی تخم و شاخ بر و بید باید که زمین قابل را
از وحل و خاشاک نیک پاک کنند و در وی حفره‌ها بکنند هر یکی مقدار رشته گز و یک سال
بگذارند تا هوا و حرارت بر وی بگذرد و اگر شتاب کنند مدت دو ماه در روی آن بگذارند
بعد از آن قضبان زیتون را هفت روز در میان خاک نمناک بدارند و روز هشتم تکلف
در آن مغاکها غرس کنند و در هر یکی سه چهار تا بنشانند و نیمه آن در نشیب خاک بکنند تا
نصفش ظاهر گردانند و هر روز و یا آب بدهند تا وقتی که عروق آن مستحکم شود و در
بعضی مواضع که مناسب باشد در گرد وی جوی بکنند تا در آن آب جمع شود و غرایس از
جمیع جوانب از آن آب بخورند و هر سال اطراف اثر از سیل بکنند در زخم بشارند و باید که
ان شاخ که می کارند املس باشد و راست و تازه و بی عقده و از درخت مثمر و غلظ آن
مثل غلظ شاخ انگور باشد میانه یکساله یا دو ساله باشد و یا نیز از بیخ درخت بر کنده باشند
یا از ساق آن ببرد جهی که از پوست غلیظ اصل تازه زیاده باشد و اگر خواهند که

سفال بنهند و در میان ریسمان در سر پا بیندازند تا از برد و حشرات خورده ایمن گردد
ان شاء الله تعالی فلاحت شجر التین درخت انجیر درخت شریف است و در جاهای گرم
و هواهای معتدل بیشتر باشد و بهترین زمینهای وی آنست که قوی باشد و در وی رطوبت
نباشد و آب بروی آن نزدیک نباشد و از وی تخم بروید و بچه و شاخ اگر خواهند
که تخم وی را بکارند از جنس تنک بگیرند و دو روز در آب بخیسانند و بعد از آن با سرگین
گاو بیامیزند و ریسمان بروی آن بمالایند و در زمینی راست کرده حفره بکنند و در
شیب آن مقدار یک دست دفن کنند و بخاک بپوشند و در حال آب بدهند و بعد از چند
گاه که آن تخمها همه بروید و چون مقدار یک گز از زمین بلند شود از آنجا بر کنند و در جای
دیگر بنشانند تا وقتی که مقدار سه گز شود از آنجا نقل کنند و در جایی که خواهند بنشانند
و در شیب آن پارچه دوا بر اسفل بیندازند تا از کرم و بعض ایمن شود و اگر شاخ بکارند
از قضبان تنک بگیرند و سه روز در آب و نمک بخیسانند بعد از آن در جایی راست
کرده غرس کنند و اگر سرگین گاو آلوده نصب نمایند بهتر بود و اگر تخم های الوان مختلفه را با
هم بیامیزند و در خرقه کهنه کتان ببندند و در مقدار چهار انگشت مغاکی دفن کنند بخاک
و سرگین بپوشند و آب دهند و چون بروید از آنجا بر کنند و در جای دیگر بنشانند الوان
مختلفه را با هم بیامیزند بار آورد و اگر قضبان الوان مختلفه را بر گیرند و همه را بریسمان
بروی محکم ببندند و در حفره دفن کنند و بالای آن سرگین بیندازند البته بروید و الوان
مختلفه بار آورد و بعد از آن اگر خواهند همانجا بگذارند یا بجای دیگر نقل نمایند و باید
که هر شاخی که می نشانند زیاده از شبر نباشد و نیمه وی را در زمین بکنند و اگر سرنگون
غرس کنند بار زیاده دهد و لطیف و اگر در شیب هر درختی دو سه تا مصطکی دفن کنند



بپاشند تا بروید و بعد از چند سال که بزرگ شود چون بار آورد در خوشه های وی رنگهای
مختلف بماند و اگر خواهند که وی را دانه نباشد یا خود دانه‌ای وی اندک شود شاخ وی را
بشکافند و مغزش بدر آورند و بریسمان بر وی محکم ببندند چنانکه بهم متصل شود بعد از آن
در جایی بنشانند و اگر بجای مغزش تریاق نهند و بریسمان درخت بید بندند و در
محل غرس هر باره تریاق طلا کنند و بعد از آن بنشانند و در هشت روز یکبار آب
تریاق آمیخته دهند انگور آن بمنزله تریاق شود حتی که اگر ورق وی را بکوبند و بر گزیدگی
مار نهند شفا یابند و اگر چوب وی را نیز بکوبند و با بول گاو یا شیر حمار خمیر کنند همین
عمل بکنند و باید که نیز سر هر شاخ مغروس سرگین گاو طلا کنند تا شیب وی یک رنگ زرشته
بکند و از آفتها ایمن شود و اگر گاه عدس و نخود در کاه ماش و باقلا هر چهار را مسحیه در تغار
انگور بنهند از آفات محفوظ گردد و اگر در آنجا باقلا یا خیار یا کدو بکارند همین حکم دارد
و باید که کرنب بکارند که در میان ایشان تضاد باشد و اگر در شیب قضبان قطران
بمالند و بعد از آن بنشانند از آفات کرم و غیره ایمن شود و اگر پاره بورق را
بسوزند و در آب بدر آرند چندانکه غلیظ شود و در وقت قطع انگور بر سر شاخها طلا
کنند زود ثمره دهد و نیک بار آورد و اگر بورق را با ثفل انگور بکوبند و در تغار بالیند
همین عمل بکنند و اگر بر درخت قراصیا سوار شده باشند قضبان وی را ببرند و قضبان
قراصیا سخت کنند و بگل کرم به پیچند تا پیوسته شود در وقت نشو قراصیا بیاید و اگر
کاردی که بآن درخت انگور خصی میکنند پیه گداخته خرس طلا کنند و یا شیر گوسفند
و برگ عنب الثعلب بپرورده بمالند و یا پیه گاو و خون خوک بمالند و یا بخاکستر سیر کنند
و یا خاکستر قضبان انگور یا سیر آب یا آبی که از شاخ بریده وی بچکد بیامیزند و در ظرف

بنشانند و خاک برکنند اگر سرش از خاک بیرون آید فبها و الا هر چند که باشد سرش را بحفره
به بندند و بگذارند و هر سال ساق آن پاک کنند و خاک بریزند چندانکه بیرون آید بعد از آن
هر یکی را بطرفی برند بر زمین جا بدهند تا بر غرس کرده و باید که آن شاخ از بستان جدید
دار بستان عتیق نباشد بلکه از بستانی باشد که بسال میان هفت و هشت باشد و
مثمر و از درختی که در هوای مناسب باشد و از شاخهای میانه وی بود و غلیظ و ضعیف
نباشد تازه باشد و تندرست و قوی دیگر آن و میانه و متقارب العضو و اگر در شب
آن از شاخ دو ساله سه ساله مقدار یکدست بشکل چوگان باشد بهتر بود و اگر بوقت
بریدن قضبان غرس آن ممکن نباشد همه را در زیر زمین نم دفن کنند و یا در ظرفی سر نم
بدارند تا وقت زراعت و اگر اغراس دور باشد و قضبان بسیار روز مانده باشد
یک شبانه روز در آب بخیسانند بعد از آن بنشانند و اگر قضبان تازه سر باشند همچنین
تصنع کرده غرس کنند بهتر بود و اگر از انواع رز به غرس کرده باشد باید که سال بسال
بتدریج بر انواع جیده ترکیب کنند و باید که هر سال قضبان زواید وی را پاک کنند
تا باقی قوت بگیرد و هر درختی که از جای بجائی نقل کرده باشند زواید وی را بدست
بشکنند و بکار برند و بهترین انواع ترکیب وی آنست که وقتی که سه چهار ساله باشد
قضبان تازه او را از شب ببرند و بر زده شاخ مناسبی ترکیب کنند بر وجهی که
هر دو یکی شوند در بستان باشد یا در صحرا و اگر خواهند که انگور شیرین شود در زمین
بلند و ریگستان و سنگستان که سنگ وی قابل نوره باشد بکارند و اگر خواهند که در
یک خوشه رنگهای بسیار شود شاخهای الوان مختلفه را یکجا به و همه را در استخوان ساق
گاو بکنند یا خود همه را بریسمان بروی محکم به بندند و در حفره راست کرده بنشانند

بسیار و ثمراش زیاده خاصه قضبان وی را قطع کنند و آن در گرمسیرها و سردسیرها می باشد
و ابتدای کاشتن آن نزد بعضی روز آخر دی ماه بود و وقتی که باد دبور وزد و پیش برخی
وقت سبز شدن درختان بود و گویند وقت بریدن رزها است و گویند وقت برگ ریزی
غرس کنند در جای که آب کمتر باشد و بوقتی نگارند که قمر تحت الارض باشد و بعضی گویند وقت
غرس آن هنگامی است که از ماه دو شب باقی مانده باشد یا دو روز که بشنبه بود وقت
بریدن نیز مثل این اوقات بود و بهترین زمین ها زمینی بود که گلش طیب باشد چنانکه اگر
یک گز از وی بکنند و از نشیب وی پاره خاک بگیرند و با آب باران بیامیزند و در ظرف آبگینه
صاف سازند و بچشند بطعم انگور و شراب وی باشند و از آن نیز گاهی تخم بکارند و گاهی
قضبان و از همه بهتر بود و می باید که زمین او را راست سازند و نیکو نرم نمایند و در آن
زبل بیندازند بعد از آن در هر سه چهار گز حفره بکنند و در وی دو سه شاخ تاک بنشانند
سر یکی بیک طرف و مقدار یک دست از زمین بلند و آب بدهند تا بر دهد و در بعضی جاها بر
عرشه بیندازند یا بر درخت دیگر و نیز در بعضی نهری بکنند و تلی بسازند و ساق وی را در میان
آن بکنند و این نوع در مواضع نباتات رده بهتر بود تا در زمستان پاسبانی پوشند و در بعضی بلاد
که آب کمتر باشد در وقت نزول باران و جریان سیل و در زمین های سیراب قریب یک
گز و نیم حفره بکنند کوچک یا بزرگ و نشیب آن فراخ بکنند و دهانش تنگ و در هر جا چند
شاخ بنشانند و در گرد هر یکی سه چهار یا سنگ یا کلوخی نهند از جهت گرما و در هر سال
انجار را نرم بسازند و از گرد وی بمقدار خاکی که بیل بردارد دور کنند و عروق آن را
پاک بکنند و در بعضی جاها که آب نرسد و زمین قابل بود در ژرفی ده گز یا زیاده و یک چاهی بکنند
چندانکه باب و نم رسد پس از آن در هر یکی بیست یا سی عدد از قضبان یا نهال قائم

بجوان چنانچه اگر سرش ببرند بمیرد و دیگر نروید و دیگر اورا نر و ماده باشد مادام
که از نر وی بر ماده وصل نشود ثمر نیک ندهد و نر وی را عشق و میلی بماده باشد
چنانچه گویند که برای ماده از بستانی به بستان دیگر کنند کج شود و طبع وی را بوی باشد
چون بوی منی آدمی بهترین اوقات کاشتن وی فصل تابستان بود و از آن گاهی
تخم بکارند و گاهی بچه اگر تخم آن بکارند در زمین سخت شور بقدر دو گز مغاکی بکنند
و خاک را با سرگین چهارپایان بیامیزند و پاره نمک در وی بکنند و همه را در آن مغاک
بیندازند بعد از آن تخم خرما را که از جنس نیک باشد و از درخت مثمر بگیرند و دو روز
در آب بخیسانند و از اندازه بشکافند و در آن خاک بنهند و شکم آن بجانب بالا و سر بجانب
بسوی مشرق و در هر روز آب بکار دهند تا وقتی که بروید و قدری بلند شود پس از آن
در هر سه روز یکبار آب بدهند تا وقتی که دو ساله شود بعد از آن جا بجای دیگر نقل
کنند یا در همانجا بگذارند و اگر بچه وی را بکارند از آن بچها که برگرد او رسته باشند سه
ساله یا شش ساله یا چهار ساله برکنند و در جای راست کرده بنشانند و هر چه مغرس
قوی باشد مستحکم آن بهتر برود و زودتر بلند شود و باید که در هر سال یکبار بیخ نهال
وی را نرم بکنند و پاره نمک یا شوره خاکی در آن بیندازند تا قوت بگیرد و بلند شود و
اگر در وی دردی شراب تیز بریزند روا بود و از هر دو درختی که میوه بیاورند اگر از
هر یکی پاره پوست برکنند و بر آن دیگر سخت بچسپانند از جایی که پوستش گرفته اند هر
دو بار آورند و اگر از طبع نر طلع بماده بنهند درختی باید و بار آورد در من شجره نهال
فلاحت شجرة العنب درخت انگور درخت شریف است و از درختی بدرختی می پیچد چنانکه در
دو سه هزار گز میشود و هر چند که درازتر میشود قوت آن بیشتر میگردد و شاخهایش بسیار

این تجربه معلوم شده است از کتاب فلاحت فلاحت درختها را سفرجل و سیب بار بسیار کنند
آنی از درخت بار کنندی آزار و برگ بید انداخته پس شغالی بکنند تا کمر مرد آنگه یک آبرش در بن
درخت نیم خاک پس آب را در بن آن شغال کنندی آزار و برگ بید ریزند پس بپوشند و ریگ زیر آن کنند
تا هموار شود پس در هر یازده روز آب در زیر آن می ریزند چنانچه برآمد تا که سال آبی آن
نماند و سیب را نیز همچنین بارش توان داشت فلاحت شفتالو را شفتالو گویند هرگز
خواهند که مغز شفتالو را در میان هر دو شیرین کنند یک بادام دو مغز را بیرون کنند و
مغز شفتالو را در میان هر دو نهند و بکارند چون برآمد هر سه بهم بپیچند یکی گردند تا همه
یکی شود و آنکه چون برآمد مغز شفتالو شیرین باشد و اگر زرد شفتالو گل سرخ بکارند خوشبو شود
فلاحت اگر زفت بحری بگذارند و از ابر الوز بنهند در بماند و تباه نشود و اگر خواهند
که شیرین بیارند شعاعی در زیر بن زردالو بنهند کرده هر سال چهار بار نمک در بن درخت
بنهد کرد هر باری بمقدار یکمن شیرین شود حفظ فلاحت اگر غنچه گل سرخ پیش از آنکه بشکفد
در میان نی بنهند و هر دو سر گل گیرند و بنهند تا آنکه خواهند هرگاه که از نی برآرند و آب
گرم بر او ریزند بشکفد بمانند ساعتی همچو گل تازه فلاحت نعناع بیارد یکباره ریسمان
خام و عسل بر او بیالایند و جای که گلستان باشد بیا و بزنند تا بر آن ریسمان برسند
پس قطعه قطعه کرده بکارند نعناع بروید عجایب بفلاحت تخم بادنجان در شهد و روغن
هفت روز ببرود و در سرگین افکنده خشک باشد و مردبه را یعنی شهیه خرد که آغاز
برآمدن کنند بشکافد و تخم های مذکور در و انداخته باز وصل کنند چون مردبه تر گور بزرگ
شود تخم مذکور بیرون آورد هر گاه آنرا بکارد در بوته بادنجان خربزه بار دهد
فلاحت نخل یعنی خرما مخصوص است بگرم سیر و درختی است شریف و از آدمی شباهت است

سیب بر درخت شاه توت پیوند کنند میوه آن سرخ شود و شاخ جوز بر درخت دیگر پیوند
نتوان کرد اما بر درخت جوز دیگر پیوند توان کرد و زردالو و بادام پیوند توان کرد و همه
اشجار با درختی الفت دارند پیوند او با همها میکرد و نارنج بر سیب پیوند توان کرد و اگر نارنج
بر شاخ توت پیوند کنند رنگ نارنج سرخ بود و بعضی گفته اند که انار را با نارنج الفت دارد و درخت
زیتون با تاک الفتی دارد تمام و پسته را با حبة الخضرا پیوند توان کرد و بالعکس هم گاه بود که
تاک بر درخت سیب پیوند کنند باین طریق که چون در جوار هم باشند درخت سیب را به برمه سوراخ
کنند و شاخی که از تاک در جوار آن باشد در آن سوراخ در آورند چنانچه از دیگر طرف بیرون آورند
و آن شاخ را همچنان بگذارند متصل به درخت تاک تا حدی که غلط آن مرتبه بود که تمام آن نقبه
گرفته شود و بعد از آن دو سال بیخ او را از درخت جدا کنند و این تاک متصل به درخت سیب شود
و از آن درخت آب میخورد و بار آن پیش از درختهای تاک دیگر باشد و باید که شاخهای باریک
درخت سیب و سرهای شاخ او را در مدت دو سال مذکور بریده باشند تا پیوند تاک قوی گردد
فلاحت و بعضی شفتالو را بر درخت سیب پیوند کنند باین طریق که تخم در موضع اول نهال بید بنشانند
و بعد از آن دانه شفتالو نزد آن نهال بنشانند و چون شفتالو و نهال سبز شود شاخ بید را
منحنی سازند و سر آن شاخ را در زیر خاک محکم کنند تا همچنان منحنی بماند پس وسط آن شاخ منحنی را
شق کنند و سر نهال شفتالو را از آن شق بیرون آورند و آن شق را بریسمان باریک از
قنب یا از لوح محکم بپیچند و آن شق را بگل خالص بیالایند و کوزه پر آب را در زیر سوراخی کنند
و بالای آن بیاویزند که قطره قطره از آن آب میچکیده باشد و تمام تابستان باید که این کوزه
آب داشته باشد پس در بهار آینده بیخ درخت شفتالو را از بید قطع کنند تا آنچه باقی ماند از
درخت بید آب میخورده باشد چون این درخت بار آورد شفتالو را دانه نباشد و صحت این

شود و بار اورد و پوست ان بغایت تنک بود و بعضی مردم بادام او هر دانه که مغز دارد با این طریق
نشانند پوست ان دانه که این درخت بار آورد تنک بود فلاحت سوسن در وقتی که غنچه سوسن بحال رسد
انرا از زردی زمین ببرند و محل قطع انرا بقیر الوده کنند و در کوزه نهند و سر کوزه را بگل محکم
بسازند و ان کوزه را در زمین پنهان کنند تا یکسال همچنان تازه بماند پس در هر وقت که خواهند
انرا بیرون اورند و از کوزه و در افتاب کل ان شکفته گردد و تازه باشد فلاحت پیوند سنبی در مغز
پیوند کردن هر درخت که پوست غلیظ دارد چون درخت انجیر میخی از چوب گز یا چوب دیگر که
محکم تا شد پیدا کنند و بان میخ پوست انرا سوراخ کنند چنانچه باصل چوب ان ضرر نرسد پس
میخ بیرون اورند و شاخ درخت که پیوند خواهند کرد در او زنند در ان سوراخ و انرا بلوح ببندند
و بگل پاکیزه بگیرند بالا بندند و از بالای ان کوزه پر آب بیاویزند که قعر ان سوراخ باریک داشته
باشد و آب از ان قطره قطره میچکیده باشد تا هنگام که پیوند گیرد فلاحت پیوند در وقتی
که باد شمال می امده باشد مناسب نیست بلکه وقتی که باد جنوب می آمده باشد و شاخی که بجهت
پیوند ببرند که نور ماه در نقصان بود و اگر باران بران پیوند آید انرا نافع بود مگر انجاکه پوست درخت
که بران پیوند شده غلیظ بود که باران انرا زیان دارد و بهترین اوقات بجهت پیوند کردن اوایل
خزان است که شب و روز برابر بود تا به نیمه قوس و بعضی گفته اند که وقت پیوند کردن ان زمانی است
که شعری یمانی طلوع کرده و حرارت تابستان کمتر شده باشد فلاحت اشجاری که بر دیگری پیوند
توانکرد شاخ انجیر بر درخت شاه توت و درخت سیب بر درخت امرود پیوند توان کرد زیرا که
این اشجار را با یکدیگر الفت است و بر هم پیوند میتوان کرد لیکن در پیوند کردن پوست این درختها
را سوراخ باید کرد و تعرض بچوب ان نباید کرد و درخت امرود چوب انرا بجهت پیوند سوراخ
توان کرد چون شاخ امرود بر درخت شاه توت پیوند کنند میوه ان سرخ شود و همچنین اگر شاخ

پس اصل آن درخت را در حفره کنند و آنرا با همه عروق آن در کشند و این بعروق آن سابند
و آنرا چنان برکنند که عروق آن در زمین گسسته نشود و همچنان بیاورند و در حفره نهند و ملاحظه
کنند که آنچه از شاخهای آن در موضع اول بجانب مشرق بود این زمان نیز بجانب مشرق بود و برین
عروقهای آن را راست سازند که بر هم پیچیده نشود و قدری سرگین در آن حفره ریزند و بیخ آن
درخت را به سه موضع ستون بندند تا از باد متحرک نشود و دو سبوی آب در دو طرف اصلی
آن درخت نهند و قعر آن سبو را سوراخ باریک کنند تا آب از و ترشح شود و هر وقت که آب
کم شود در آب کنند تا دو ماه بدین دستور عمل نمایند و بعد از آن بطریقی که بیشتر آب میخورد آب
دهند اذ بیت علاجت چون خواهند که درختی را خشک سازند باید که دانه را بر عدس کنند و بجایند
تا شستا پس همچنان آن عدس در دهان نگاه دارند و شاخهای آن درخت را بدندان بگیرند درخت
خشک شود و اگر میخ آهنی در آتش کنند تا سرخ شود و در چند موضع متعدد با اصل آن درخت فرو برند
خشک شود و اگر بیخ آن درخت خالی کنند چندانکه عروق آن پیدا شود و شاخ گوسفند که کهنه
شده باشد بسوزند و میان عروق درخت پر کنند خشک شود علامت انار اگر بوقت نشاندن
درخت انار گرداگرد نهال آن در حفره سنگ بچینند یا بار عنصل در بیخ آن درخت بنشانند آن
درخت را سرنگون بنشانند چنانچه فروع شاخ در حفره بود انار آن شق نشود و اگر نهال انار که
می‌نشانند مقدار یکذرع از آن شق کنند و مغز آن بیرون آرند و آنرا باز بهم زنند بلوح و آنرا
بگل پاک و روث دواب ملطخ سازند و بنشانند چنانچه از شق آن مقدار سه انگشت بر روی
زمین باشد چون سبز شود آنچه بر بالای شق بود ببرند و آب دهند تا بیش کند چون بار آید انار را
دانه نبود علاجت جوز جوز را چنان بشکنند که مغز آن درست بیرون آید و آنرا در قدری پشم زده
بپیچند یا در برگ خیار بپیچند از مورچه و باقی حیوانات ایمن بود و بعد از آن بنشانند چون سبز شود

زمین خشک و نمناک بر دو را میتوان کشت معالجه کردن زمین هر زمینی که محصول انیک نمی اید چون

یکسال دران زمین باقلای مصری که انرا ترمس میگویند بکارند بعد از ان هرچه دران بکارند بهتر نکو اید

هنگام زراعت ـ در وقت زراعت مجربان گفته اند اولی انست که در میزان زراعت کنند و در روزی

که باد شمالی اید تخم در زمین نباید پاشید که تنک سبز میشود و باید دانست تخمی را که زراعت خواهند

بسه دفعه زراعت کنند بعضی در اول زراعت کنند و بعضی در وسط زمان و بعضی در اواخر ابان

زراعت کنند که اگر یکی را افت رسد دیگری بسلامت ماند و چون در نیمه اول ماه تخم بکارند بهتر بود

و محصول بیشتر دهد نباید در پای زمین از آب ـ اگر خواهند که گیاه از زمین پاک شود وقتی

که افتاب در جوزا بود گیاه و خارها را از بیخ برکنند و انرا همچنان جمع کرده بگذارند تا افتاب بجدی

اید پس از ان برکنند و در مزبله اندر آید یا متعفن شود و دیگر ان گیاه دران زمین سبز نشود

و اگر داسی که ازان گیاه بر میدارند از پس سازند و انرا از خون نر بز کلان سال که از

انبار کوشند اب دهند هر گیاه و علف که ازان ببرند دیگر سبز نشود و بعضی گفته اند کرمش از

طلوع شعری یمنی بیخ درخت خار را از خاک خالی سازند و انرا ابر زرد و قرو زف بالمید اگر اینچنین

بران طلا کنند دیگر سبز نشود و نیز گفته اند وقتی که ماه در محاق باشد بوقت طلوع سنبله یا جدی هر

گیاهی را که ببرند سبز نشود. هنگام درخت در وقت درخت نشاندن بهترین وقت از همه سر آن

است ما و اخر حوت و اوایل حمل درخت توان نشاندن و گفته اند درختی که در خزان نشانند آن

باید که قمر در محاق باشد یا تحت الارض که بار بیشتر اورد و بسیار بلند نشود و هر درختی که در زیادتی

نور ماه نشانند یا در وقتی که فوق الارض باشد آن درخت بسیار بلند شود و بار کمتر اورد

فلاحت در نقل کردن درخت بزرگ از موضعی بموضعی اول ان موضع که بدان نقل خواهند کرد

حفره کنند سه ذراع در طول و عرض و عمق پس بعضی شاخهای ان درخت ببرند تا سبک شود

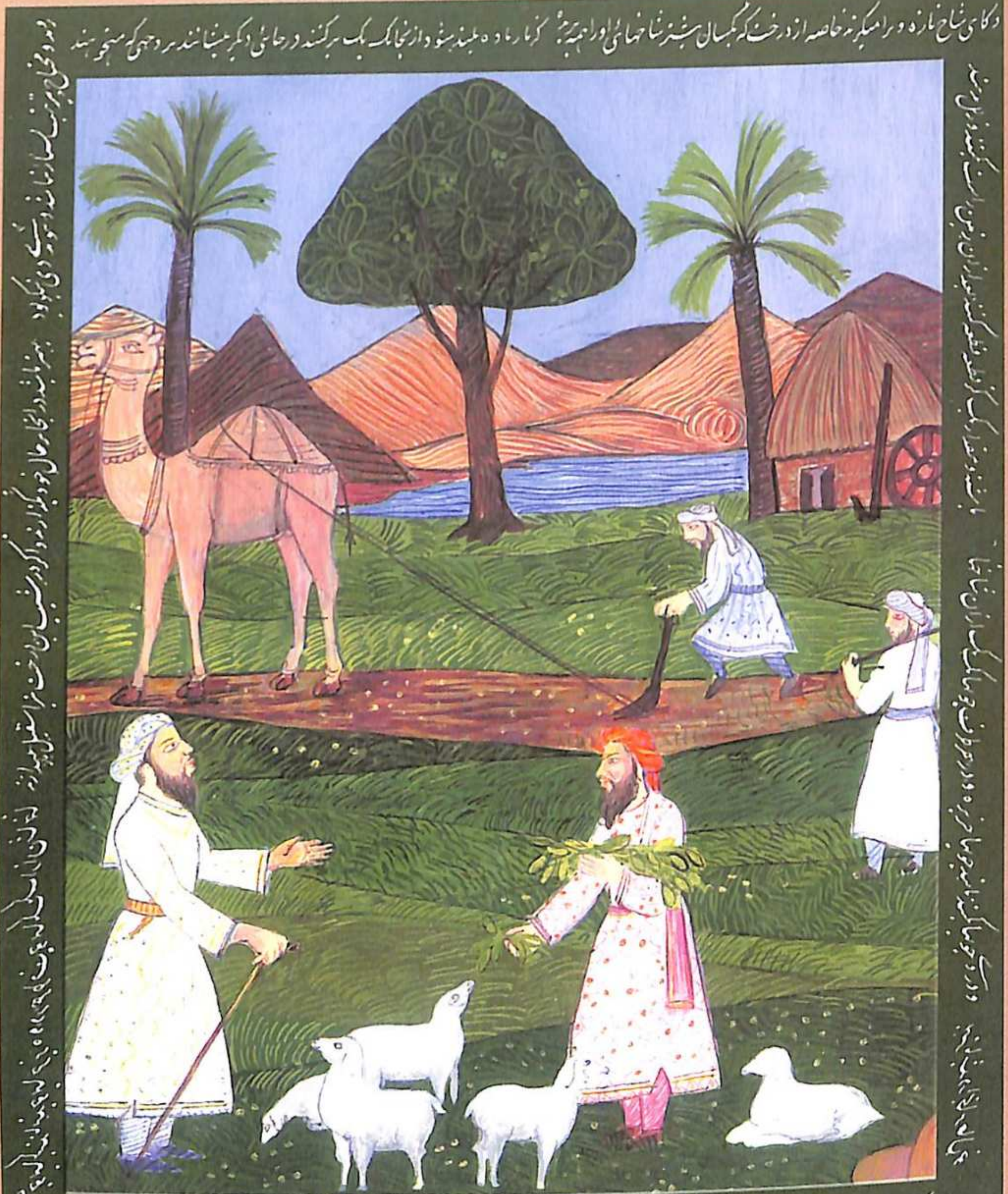
انمحصول درخت بار او زیاده میشود درختی که در بهار نشانند در فروع
دامانی ان بشود در وقت درخت نشاندن

نسخہ در فنی فلاحات

نسخه در فنی فلاحات

Nuskha Dar Fanni-Falahat

The Art of Agriculture



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